306.8
Am3

LIBRARY
RECEIVED
MAY 20 1938
U. S. Department of Agriculture

AMERICAN
DYESTUFF REPORTER

DEVOTED TO THE INTERESTS OF TEXTILE CHEMISTRY
BLEACHING ◆ DYEING ◆ FINISHING ◆ PRINTING

VOLUME 27 | MAY 16, 1938 | NUMBER 10

A suggestion
for World's Fair Orange

The wave of enthusiasm for the 1939 World's Fair is bound to reflect itself in the popularity of the colors selected.

The "Indian Orange" shade being one of "those most likely to succeed" it would be advantageous to consider the new Geigy

ERIO ANTHRACENE ORANGE R L

for Woolen Piece Goods; Knitting and Carpet yarns; and Multi-fibred fabrics when Cotton, Rayon and Acetate are to remain uncolored.

Extremely soluble and level dyeing, it has reasonably good general fastness, but is possessed of particularly **good fastness to light.**

Erio Anthracene Orange R L can be used as a self shade or in combination with other level dyeing Acid Colors.

Get acquainted with Erio Anthracene Orange R L by writing for leaflet **946.**

GEIGY COMPANY INC.

89-91 BARCLAY STREET — NEW YORK—NEW YORK

Sole Selling Agents in United States and Canada for J. R. Geigy, S.A. Basle, Switzerland

In Great Britain The Geigy Colour Co., Ltd. National Buildings Parsonage, Manchester

Boston · Providence · Toronto · Cincinnati · Philadelphia · Charlotte · Portland, Ore.

OFFICIAL PUBLICATION OF THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

For Instantaneous Wetting Out Of All Fabrics

DECERESOL WETTING AGENTS

Deceresol Wetting Agents are unusually powerful surface tension depressants. At extremely low concentrations they wet out grey cotton instantaneously. In dyeing, Deceresol Wetting Agents produce thorough penetration of the dyestuff into the fibre, yielding perfectly level shades.

In the mill, Deceresol Wetting Agents save time and money in every operation—where faster wetting means better results in less time. A few of their many uses are:

1 The wetting out of grey cotton piece goods prior to caustic boiling and subsequent chlorine bleaching.

2 Wetting out grey cotton piece goods prior to peroxide bleaching.

3 Mixing with animal and vegetable oils (previously sulphonated) to form a liquid soap possessing strong detergent properties, without affecting colors when used in conjunction with sodium or hydrogen peroxide in bleaching grey cotton piece goods containing vat-dyed colored stripes.

4 Wetting out grey cotton piece goods on a mangle, making them instantaneously and uniformly absorbent, which is necessary prior to grey sanforizing.

5 Mixing with sulphonated vegetable oils for the treatment of cotton (bleached or dyed) fabrics to increase penetration prior to sanforizing.

6 Adding to the dye bath on grey cotton piece goods dyed direct from the bale to produce penetration and uniformity.

7 The preparation of raw stock cotton, yarn, and cotton piece goods prior to dyeing with all types of colors.

8 Adding to the dye bath on all types of machines and all kinds of colors where increased penetration and uniformity of shade are otherwise difficult to accomplish.

9 A dispersing agent in the dissolving of dyestuffs in order to give complete solubility and full color value.

10 The preparation of grey cotton piece goods to be printed direct from the bale.

11 An admixture to a printer's paste to give thorough penetration, greater color value, and increased fastness to soaping, especially on cotton piece goods printed direct from the bale.

12 An admixture to vat color pastes where the process calls for pigment dyeing with subsequent reduction in the fibre or fabric.

13 De-oiling, or so-called "de-gumming", of raw stock cotton that has been dyed in the presence of sulphonated vegetable or animal oils which usually interferes with the spinning qualities. This is done in the final bath after rinsing.

14 The treatment of cotton piece goods prior to shrunk finishing.

15 The treatment of cotton piece goods and the addition to starch pastes on absorbent finishes.

16 The treatment of water prior to the addition of dry starch. This insures absence of lumps, complete wetting and complete solubility on boiling.

17 Use either with or without soap in the after-soaping of cotton yarns and fabrics.

18 In "brown scouring" for obtaining better penetration of the acid and greater solubility of calcium and magnesium salts.

19 The oxidation of vat prints, for preventing over-oxidation in the Bichromate or Perborate baths, for increasing the efficiency of oxidation and for overcoming any harsh feel that may be left by Bichromate.

20 The desizing of Rayon or Acetate piece goods.

Deceresol Wetting Agents can be used in hard water as they form soluble calcium and magnesium salts.

For neutral or slightly acid and alkaline solutions, use Deceresol OT; for strongly acid or alkaline solutions, Deceresol OS is recommended.

Write to nearest district office for further information.

89 Broad Street,
Boston, Mass.

620 So. Delaware Avenue,
Philadelphia, Pa.

20 North Wacker Drive,
Chicago, Illinois

822 West Morehead Street,
Charlotte, North Carolina

* Trade-Mark

AMERICAN CYANAMID & CHEMICAL CORPORATION

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

American Dyestuff Reporter, Vol. 27, No. 10, May 16, 1938. Published every other Monday, Copyright, 1938, by Howes Publishing Co., 440 4th Ave. New York, N. Y. Domestic subscription, $5.00; Canadian, $6.00; foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y. Post Office, under the act of March 3, 1879.

A. P. HOWES
Publisher

M. D. REESER
Advertising Manager

AMERICAN DYESTUFF REPORTER

LOUIS A. OLNEY
Directing Editor

NORMAN A. JOHNSON
Managing Editor

Copyrighted 1938 by Howes Publishing Co.

DEVOTED TO THE INTERESTS OF TEXTILE CHEMISTRY
• BLEACHING • DYEING • FINISHING • PRINTING •
AND THE NECESSARY MECHANICAL EQUIPMENT

"Circulated Everywhere Textiles Are Processed"

Subscription Price: $5.00 per year; Canadian, $6.00; Foreign, $6.00. Fifty cents per copy

VOLUME 27 | MAY 16, 1938 | NUMBER 10

CONTENTS OF THIS ISSUE

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

General

The Wearing Quality of Nine White Cotton Fabrics as Determined by their Physical Characteristics.... 257
Lucile Marker and Katherine Cranor

Trade Notes—New Products 281

Proceedings of American Association of Textile Chemists and Colorists

Calendar of Coming Events..... P261
Processing of Dyed Cotton and Yarn in the Mill.... P262
Allen Jones
Mineral Process Oils in the Textile Industry..... P265
Lyman Billings
The Dyeing and Finishing of Spun Rayon Fabrics..... P269
Ross M. Stribling
Some Uses of Sodium Silicates in the Textile Industry P274
William Stericker

Report, North Carolina State College Student Section P277
Meeting, Philadelphia Textile School Student Section P277
Meeting, Northern New England Section..... P277
Meeting, Philadelphia Section..... P278
Spring Meeting, Southeastern Section..... P278
Membership, May 1, 1938..... P278
Unemployment Register P279

Official Publication of the American Association of Textile Chemists and Colorists

THE OBJECTS OF THIS ASSOCIATION ARE:

"To promote increase of knowledge of the application of dyes and chemicals in the Textile Industry.

"To encourage in any practicable way research work on chemical processes and materials of importance to the Textile Industry.

"To establish for the members channels by which the interchange of professional knowledge among them may be increased."

Published Every Other Monday

HOWES PUBLISHING CO. ~ ~ 440 FOURTH AVE. ~ ~ NEW YORK

CLOSING DATE FOR ADVERTISING COPY: MONDAY PRECEDING ISSUANCE DATE

From the Files of
CALCO
Technical Service

A PERFECT MATCH . . . on Unions

The problem that one mill put up to us required matching as economically as possible 12 shades on cotton and wool unions for boys' suits, mackinaws, ladies' cloaks and ski clothes. Our Technical Service Staff was not asked to produce any specific saving, but from 8% to 10% resulted.

A great deal of the research we have done on union colors is shown by a new shade card just published, which contains 25 pages of swatches, each with five different threads showing results obtained. We will gladly send it to any dyer or chemist writing to us on the stationery of his firm.

This book represents one of the ways in which Calco is constantly trying to help in practical ways any user of dyes. Our Technical Service Staff is ready to work with you in applying new ideas in practical and economical ways, as well as straightening out the difficulties that sometimes arise in normal production. If you would like a member of our staff to call simply write or wire our main office or nearest branch. There is no cost or obligation.

CALCO DYES ARE BETTER BUYS

THE CALCO CHEMICAL COMPANY, INC. · BOUND BROOK, NEW JERSEY

Calco

A DIVISION OF AMERICAN CYANAMID CO.

BOSTON · PHILADELPHIA · PROVIDENCE · NEW YORK · CHARLOTTE · CHICAGO · PATERSON

AMERICAN
DYESTUFF REPORTER

VOLUME 27 MAY 16, 1938 NUMBER 10

The Wearing Quality

of Nine White Cotton Fabrics as Determined by Their Physical Characteristics*

LUCILE MARKER† with KATHERINE CRANOR
Department of Textiles and Clothing, Iowa State College

SINCE cotton has many characteristics lending itself to a wide range of uses, many new, light weight and novelty weave cotton fabrics are appearing on the market making it increasingly difficult for the consumer to choose wisely.

This investigation was undertaken to determine to some extent how far the wearing quality of the fabrics studied is influenced by their physical characteristics.

EXPERIMENTAL PORTION

Nine cotton fabrics were used for this research: waffle cloth, plissé, middy twill, percale, madras, broadcloth, piqué, poplin, and shantung. All of the fabrics were of different weave. The new fabrics were given a physical and chemical analysis.

The physical tests were made under standard conditions of temperature 70° F. and relative humidity of 65 per cent. The fabrics were exposed to this atmosphere for at least four hours before testing.

The following tests were made according to the directions of the American Society for Testing Materials.

The width of each fabric was determined by laying it without tension on a flat surface, measuring with an accurately calibrated measuring steel, and calculating the average of five measurements.

To determine the weight of fabric three specimens four inches in length extending the entire width of the fabric were taken, conditioned and weighed, and the average calculated. Weight in ounces per square yard equals

$$\frac{36 \times 36 \times \text{wt. in gm. of known area} \times 0.03527}{\text{In. area}}$$

The thickness of the fabric was measured by means of an automatic micrometer. Ten determinations, each taken from different parts of the fabric and not less than six inches from the selvage, were made and the average calculated.

The number of yarns per inch was determined by means of a thread counter. Five determinations for both warp and filling from different parts of fabric, not less than one inch from the selvage, were made and the averages calculated.

The yarn count was determined by conditioning and weighing two ten-yard lengths of both warp and filling yarns and the average for each was calculated. (Conversion factor 1 gm. = 0.0022046 pounds.)

The twist of yarn for both warp and filling was determined by means of the Precision Twist Counter. Ten determinations were made and the averages calculated. The direction of twist was also recorded.

The shrinkage of the fabric was determined by first outlining a square eighteen by eighteen inches with a border of approximately one inch and the average of three measurements in both warp and filling directions was calculated. The fabric was then immersed in boiling water and boiled for thirty minutes at constant volume. The fabric was removed, dried, and pressed without stretching. The average of three measurements in both warp and filling directions was again calculated and the average percentage change in length and width reported.

The breaking strength of the fabric was determined by means of the Scott universal tester. Ten specimens, one and one-fourth inches by six inches, were cut and ravelled back to exactly one inch in width. Ten determinations were made in both warp and filling directions and the averages in pounds calculated. The average elongation at the breaking load was also determined.

To determine the resistance of the fabrics to abrasion the Wyzenbeck abrasion machine was used. Three specimens, one and seven-eighths inches wide and ten inches long, were cut from both warp and filling directions and the appearance and thickness noted. The strips were given

*A contribution from the Department of Textiles and Clothing, Iowa State College.

†The experimental portion of a master's thesis submitted by the junior author in part fulfillment for the Degree of Master of Science.

TABLE I
Fabric Analysis

Fabrics	Price	Width	Weave	Thickness	Weight sq. yd.	Breaking strength		Yarn							
								Number		Count		Twist			
	Yard	Inches		Inches	Ounces	Pounds		Per inch		Typp.		Direction		No. per inch	
						W.	F.	W.	F.	W.	F.	W.	F.	W.	F.
Waffle cloth	.49	34.55	Novelty	.026	3.606	46.12	18.62	77	77	25.18	35.24	L	L	21	29
Plissé	.39	37.75	Plain	.010	2.132	9.62	7.50	110	93	61.43	67.12	L	L	30	35
Middy twill	.29	35.50	Twill	.030	4.743	65.25	42.62	77	41	18.70	22.50	L	L	20	17
Percale	.49	35.31	Plain	.032	2.707	37.00	35.90	93	90	42.31	37.79	L	L	27	25
Madras	.69	35.66	Figure	.021	2.860	78.50	25.12	125	71	46.16	98.89	R	L	25	24
Broadcloth	.69	35.25	Plain	.011	3.303	84.25	19.73	127	64	33.07	48.77	R	L	24	24
Piqué	.65	35.20	Rib	.037	4.081	71.85	53.50	119	75	33.63	69.81	L	L	26	29
Poplin	.54	35.70	Rib	.032	4.081	89.62	37.37	40	48	22.60	30.54	R	L	24	20
Shantung	.39	35.68	Plain	.027	3.445	57.50	18.50	127	65	35.63	34.13	L	R	24	25

NOTE: Abbreviations—W. Warp; F. Filling; L. Left; R. Right; Typp. Thousand yards per pound.

three thousand double rubs at pressure four and constant tension and the difference in appearance and thickness was again noted. Since the fabrics showed practically no indication of wear the process was continued until deterioration was indicated and the total number of rubs was recorded.

DISCUSSION OF DATA

In general the fabrics which ranked high in thickness and weight had greater resistance to breaking strength and abrasion than the thinner, lighter weight fabrics. The tests would indicate that quality in fabrics cannot always be determined by strength and wear. Many soft, smooth, and beautiful fabrics, which have high thread count, are because of their nature, not able to withstand hard wear. Plissé and madras are examples of this type of fabric. Poplin, middy twill and piqué represent fabrics of the former group but low in the other tests.

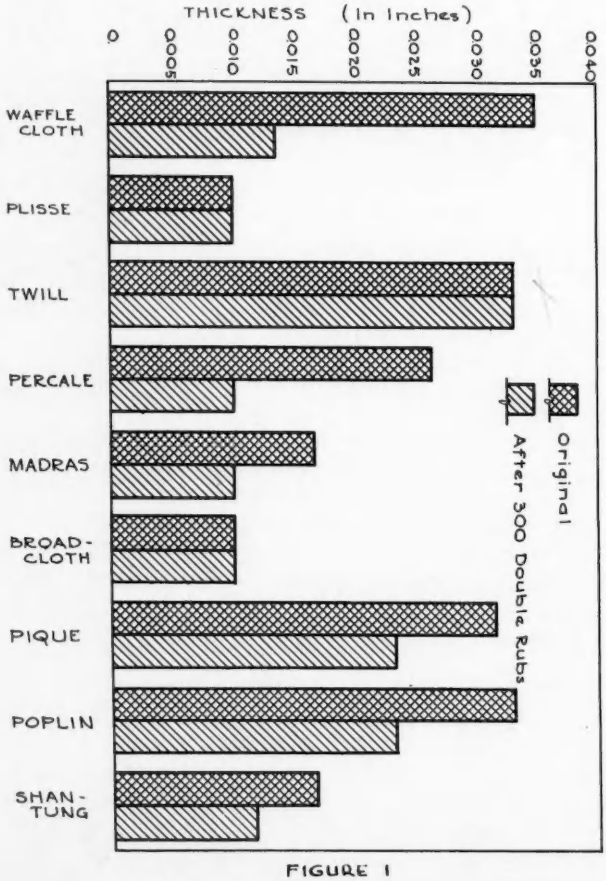


FIGURE 1

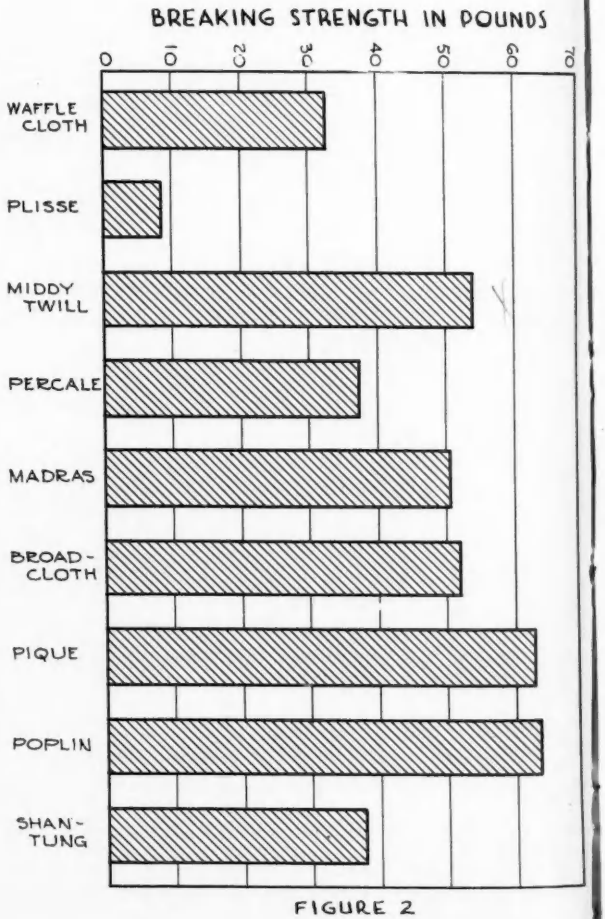


FIGURE 2

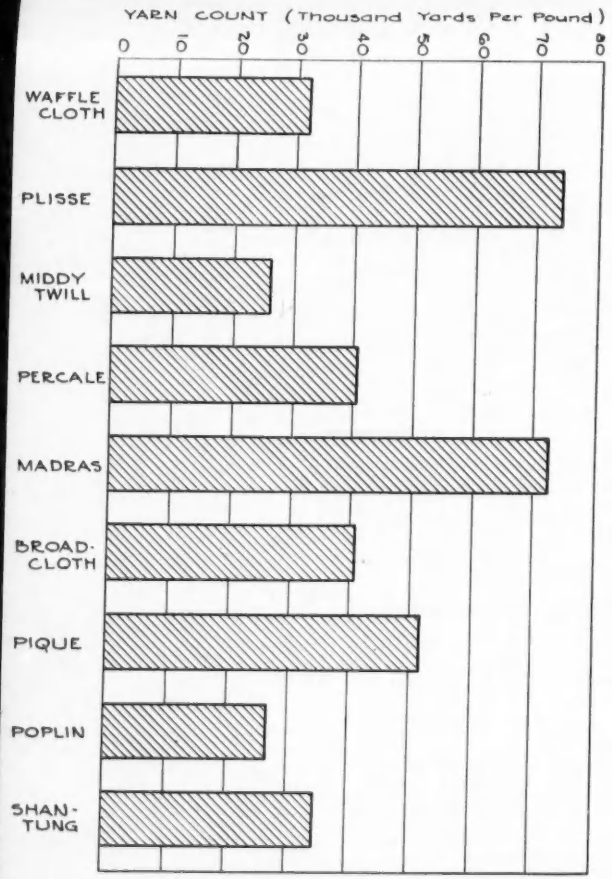


FIGURE 3

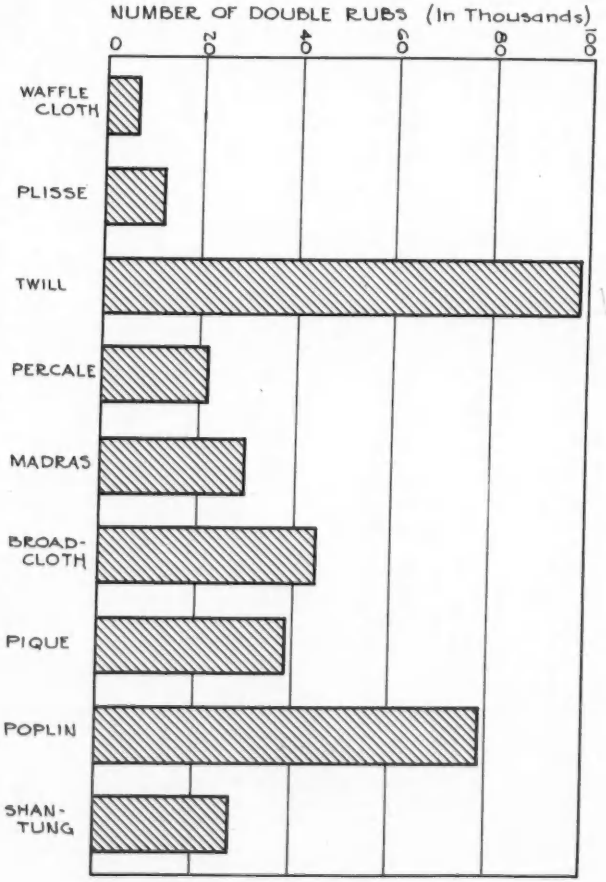


FIGURE 4

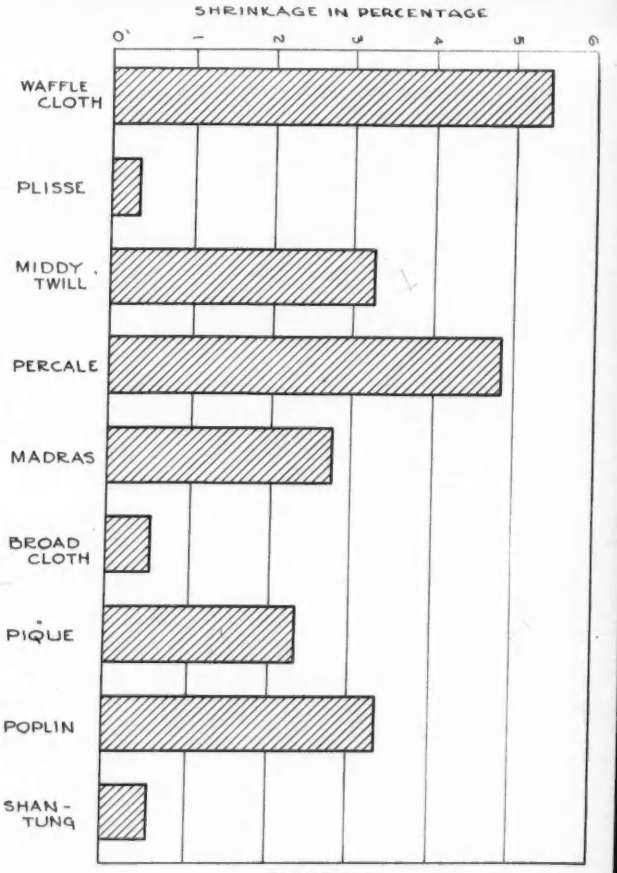


FIGURE 5

TABLE II

The Type and Amount of Sizing Found in Each of the Fabrics

Fabrics	*Sizing*	
	Kind	*Per cent*
Waffle cloth	Starch Reducing sugars	.86
Plissé	Starch	1.58
Middy twill	Starch	1.63
Percale	Chlorides Starch	1.53
Madras	Sulfates Reducing sugars	1.62
Broadcloth	Chlorides Sulfates	1.44
Piqué	Starch	.81
Poplin	Starch	.98
Shantung	Starch Reducing sugars	1.26

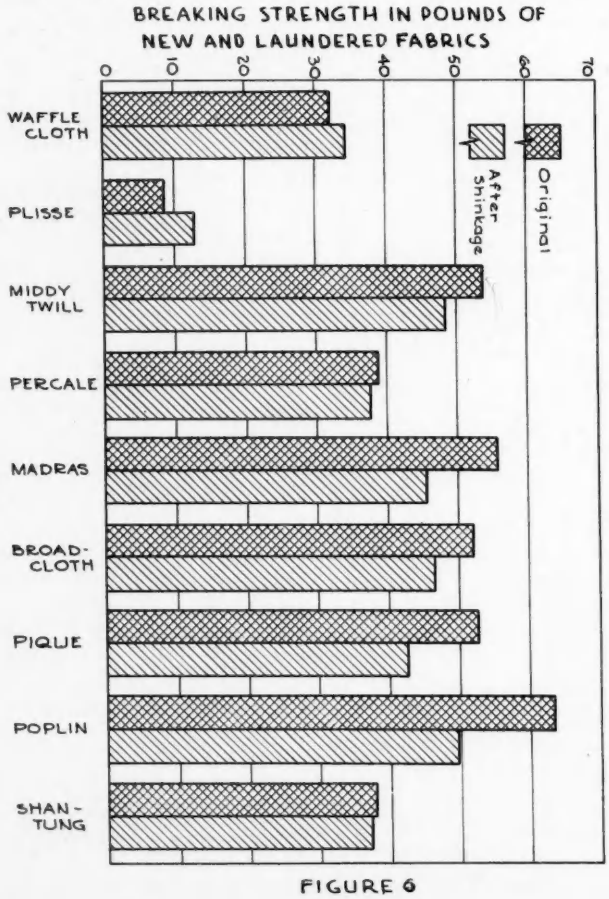


FIGURE 6

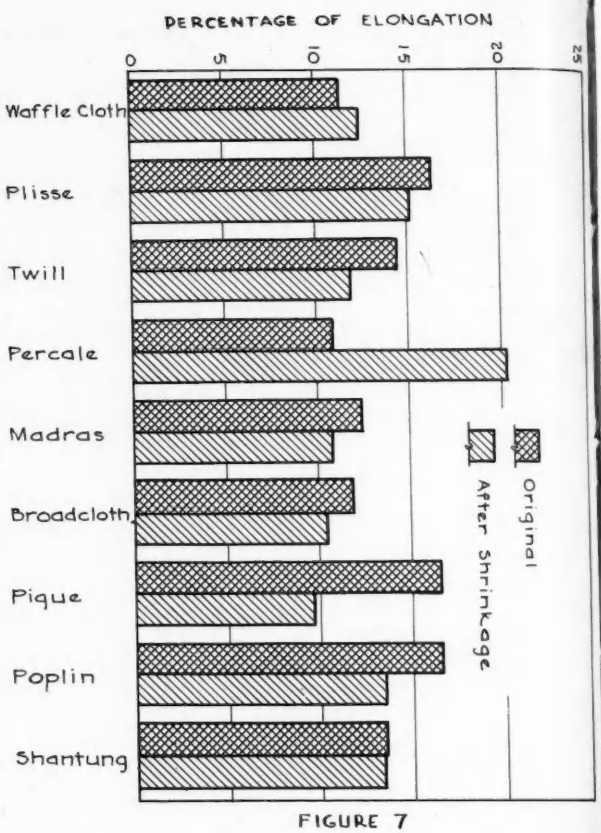


FIGURE 7

A fabric in which the warp and filling threads are equally balanced is usually thought to give greater wear than one which is poorly balanced. Waffle cloth which was a perfectly balanced fabric ranked low in breaking strength and abrasion. This was probably due to the presence of long floats on the right side of the fabric.

The rib and twill weave fabrics (poplin, piqué, and middy twill) had greater weight, thickness, and breaking strength than the plain weave fabrics.

Shrinkage did not appear to be influenced by percentage of the sizing. A number of fabrics decreased in breaking strength after shrinkage. The loss in breaking strength in broadcloth was greater than in the other fabrics.

Piqué which had the greatest elongation before shrinkage had the least elongation after shrinkage. This would indicate that the yarns were pushed closer together in the laundry process, thus reducing the amount of stretch. Percale was just the reverse, it had the least amount of elongation before shrinkage and the greatest amount of elongation after shrinkage. This was possibly due to a loss in finishing material.

None of the fabrics tested had all the qualities desirable for durability.

(Concluded on page 284)

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

MAY 16, 1938

Officers of the Association

ALBAN EAVENSON, *President*
Eavenson & Levering Co., Camden, N. J.

DUNCAN FERGUSON—ARTHUR R. THOMPSON, JR., *Vice-Presidents*

WILLIAM R. MOORHOUSE, *Treasurer*
National Aniline & Chemical Co., Boston, Mass.

HAROLD C. CHAPIN, *Secretary*
Lowell Textile Institute, Lowell, Mass.

LOUIS A. OLNEY
President Emeritus and Chairman of the Research Committee
Lowell Textile Institute, Lowell, Mass.

Councilors-at-Large

BERKELEY L. HATHORNE
G. R. KREMERS
WALTER M. SCOTT
HAROLD M. CHASE
ARTHUR E. HIRST
HAROLD DE WITT SMITH

Councilors Representing Sections

BEN VERITY (Rhode Island)
HANS MEYER (New York)
ROLAND E. DERBY (N. New England)
C. A. JONES (South Eastern)
R. M. RITTER (Philadelphia)
B. C. BLOWNEY, (Midwest)
HOMER WHELCHEL (South Central)
THOMAS R. SMITH (Piedmont)

Local Sections and Their Officers

Northern New England Section
Carl Z Draves, Chairman, Ludlow Mfg. & Sales Co., Ludlow, Mass.
John N. Dalton, Secretary, Pacific Mills, Worsted Division, Lawrence. Mass

Rhode Island Section
Richard Haworth, Chairman, 25 Fountain St., Providence, R. I.
Raymond A. Pingree, Secretary, U. S. Finishing Co., Norwich, Conn.

New York Section
George L. Baxter, Chairman, Bradford Dyeing Association, 40 Worth St., New York, N. Y.
P. J. Kennedy, Secretary, E. I. duPont de Nemours & Co., Inc. 61 Thomas St., New York, N Y

Philadelphia Section
Herbert S. Travis, Chairman, Rohm & Haas Co., Inc., 222 West Washington Square, Philadelphia, Pa.
Paul L. Speakman, 1506 Delaware Ave., Wilmington, Del.

Piedmont Section
Raphael E. Rupp, Chairman, Pacific Mills, Lyman, S. C.
J. W. Ivey, Secretary, Mathieson Alkali Works; Inc., Charlotte, N. C.

South Central Section
Nestor Grotelueschen, Chairman, Magnet Mills, Clinton, Tenn.
W. S. McNab, Secretary, Quaker City Chemical Co., Knoxville, Tenn.

Midwest Section
Edward J. Siegrist, Chairman, Holeproof Hosiery Co., Milwaukee, Wis.
Herbert W. Tetzlaff, Secretary, Geigy Co., Inc., Milwaukee, Wis.

South-Eastern Section
Robert W. Philip, Chairman, Editor, "Cotton," Atlanta, Ga.
Alfred R. Macormac, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

Lowell Textile Institute Student Section
Herman T. Buckley, Chairman; Robert A. Lemieux, Secretary.

North Carolina State College Student Section
J. E. Spainhour, Chairman; J. A. Holder, Secretary.

Philadelphia Textile School Student Section
Wayne F. Fry, Chairman; Robert Roecker, Secretary

Members should notify the **Secretary** immediately of all address changes

CALENDAR OF COMING EVENTS

Meeting, New York Section, Swiss Chalet, Rochelle Park, N. J., May 20, 1938.

Outing, New York Section, North Jersey Country Club, Paterson, N. J., June 10, 1938.

Outing, Northern New England Section, Andover Country Club, Andover, Mass., June 17, 1938.

Outing, Philadelphia Section, Whitemarsh Valley Country Club, June 10, 1938.

Summer Outing, Piedmont Section, Ocean Forest Hotel, Myrtle Beach, S. C., June 24 and 25, 1938.

Annual Meeting and Convention, Atlanta Biltmore Hotel, Atlanta, Ga., December 2 and 3, 1938.

The Processing of Dyed Cotton and Yarn in the Mill

*As Viewed by a Superintendent**

ALLEN JONES

WHEN I accepted Mr. Crayton's invitation to talk to you, I chose as my subject, "The Processing of Dyed Cotton and Yarn in the Mill", as viewed from the superintendent's standpoint. After putting some study on this line, I realized that I could not tell you very much about how your dyed cottons and yarns run throughout the mill unless I showed those instances in which the dyeing process was at fault.

Why is a Dyer anyhow? As I see it, the only possible excuse for having a dyer is that he adds color and luster and style to a product, and thereby makes it more salable. Aside from the cost in the dye house, how much more should the superintendent and mill be penalized owing to the fact that dye has been added to the raw cotton?

There is a common idea prevailing among many mills that the boss dyer is a person set apart from the rest of the bosses in the mill; that all that these other bosses do is just processing the stock through the carding, spinning, weaving, etc., but that the dyer is an unusual type of individual, that he knows certain tricks, and can do things out of the realm of the other men's possibilities. As a superintendent who has been dealing with overseers for a good many years, I have found out that not only have I seen some remarkable dyers, but strange to relate before you men here, I have known some outstanding carders, spinners, weavers, and even master mechanics. So much has this been impressed upon me that I cannot help but feel that the dyer, though a most important spoke in the wheel, should be placed in the same category as the other responsible men under my supervision. It is along this line that I am going to approach the subject today.

I am taking the attitude that a dyer is a very important man, but not necessarily more important than any other that I have, and that, just as I talk to the other man when he fails to come up to the standards I set, I am, likewise, going to talk to the dyer when he falls short of my expectations.

My first suggestion to you dyers is that you use the service men of the dyeing and chemical houses to the best possible advantage. It does not matter what you think of yourselves; how good you are; the chances are that some of these men in traveling around the country have picked up some ideas that will be very helpful to you in instituting new things in your department as well as solving some of the dyeing problems in your everyday performances.

I consider the service man a valuable adjunct to a mill's organization and always encourage all of my overseers to use them to the fullest extent; and you service men here tonight, I want to thank you for what you have done in improving the dyeing in our mills everywhere, but there is one word of caution I want to hand out to you and to the dyers also, do not waste one another's time. We appreciate your coming into our mills; we appreciate the help you give us; but whenever you have done all you can do, please take your departure. I presume that you realize that there is no one overseer in the mill who should devote as much time to his machines as the dyer. Some of them like to talk, as I do, but please tend to your business and then say "good bye."

There are just three things that we ask our dyer to do other than operate at a low cost and get a maximum production, and these three things are:

1st—Matching the shade.

2nd—Making the dyed cotton run as well through the mill, or practically so, as white cotton.

3rd—Finishing off each batch of the same dye formula so that it will weigh the same and run the same in the various processes in the mill.

Matching the shade is about all you learned at college. The fact of the matter is, your college experience was primarily mental training and acquainting you with colors, dyes, chemicals, etc., and making the work run as well as white work is a measure of your common sense and observation; and finishing off each lot the same is a guide to your organizing ability. I will go into these in detail as I take each one up.

Mr. James A. Branegan, President of the Kali Mfg. Co., gave a talk before your association in Chicago, February 15th, 1930; and in the course of his remarks used the expression "The Dyer Always Gets the Blame." He amplified this at considerable length and showed that there were a good many things outside the range of the dyer's responsibility which cause trouble.

We should not blame the dyer when such of these things

*Presented at meeting, Southeastern Section, Columbus, Georgia, Jan. 22, 1938.

as water, grade of cotton, and other things beyond control of the dyer affect his shades.

Matching the shade is a local problem for each dyer, depending to a great extent on the class of goods being made in his plant. Whereas, a match might be good enough for mills weaving stripes, it might not suit at all on chambrays, and even this match might not be good enough in dyed fillings in nap goods, so the accuracy of matching the shade is a problem that has to be faced individually by each and everyone of you.

The size of the mix opened up in the picker room determines, to a great extent, how close the shade must be matched and also, how even the dye batch must be throughout. In mills that open up just one or two bales it will probably be necessary to use some kind of leveling agent, but this will probably keep the cotton from running as well in later processes. If the mill lays down from 5,000 to 10,000 lbs. of color, and the opening equipment is suitable, my suggestion is to put a standard amount of dye on each lot and allow the size of the batch to even up the shade. It is most exasperating for the carder, spinner, and weaver, to have to run out different lots of dyed work because the shade is off. Almost any dyer is good at matching shades. I consider this the easiest part of any dyer's work and when he has accomplished it he has just about finished the first lap.

The second request that I make of the dyer is that he shall so dye his stock that it will run practically as well in the mill as does white work, and I say that this is a measure of the common sense and observation of the dyer.

Go into two mills, one of which has colored work running practically as well and at the same speeds as white work, and go into the other mill on the same general line of work and notice that the colored work run tough; whose fault is it? Same cotton, same yarn numbers, the same constructions, I say it is the dyer's fault, and I further state that it is due to his lack of common sense and observation that he is not able to make it run like the other mill did.

Maybe you do not like this, but superintendents are the men that have to run your products, and where one superintendent can be served with nice colored work and the other one cannot get it, I think it is time for both the superintendent and dyer to get together and to see what is the matter, taking up some of the little difficulties that bring about this tough colored work.

I think one of the first is the drying, i.e., taking the cotton out of the 1000 lb. batch, extracting, it, drying it, and re-baling it, in most mills. This cotton should be properly broken up so that there will be no large pieces left wet, or if enough heat is applied to dry these that the whole batch will not be too dry. Possibly you have not the proper equipment to get these results, but if you do not do it, the operation throughout the mill is going to suffer. Dyed cotton should be stocked for at least two weeks before processing in the mill.

One of the common results of improper dyeing shows up on the cards, where either the card cylinder tends to gum up or a lot of specks show in the card web; both probably due to improper washing. I have known instances where the card cylinder filled up so rapidly as to have to be stripped several times an hour.

The one real test of you dyers' common sense and observation is the running of the dyed stock through the drafting rolls of the drawing frames, either cork, leather, or koroseal. It has always been our opinion that the superintendent should appoint the boss dyer as a second hand in the card room and give him free access to visit the card room as often as he feels necessary, and also requesting the boss carder to have the boss dyer up there to see how the colored stock comes through the drawing rolls. A close association between these two men, a swapping of ideas, will do more to help dyed cotton run through the mill than almost anything I know, and then too, if you will bring the service men up into the card room with you and let them see how it runs, they also might help you. For if we do have trouble on these drawing rolls, either due to excessive top clearer waste or licking up, hard ends will be caused on the roving frames which will probably make ends come down in the spinning room.

There are two other things that speak for themselves as to the proper running of dyed cotton and one of them is running in the size box of the slasher or finishing machine, and the other is uneven fading out in the bleachery. The first is probably caused by insufficient washing or cheap dyes, and the second by using dye stuff that is not meant for modern bleaching, or allowing the dye to go out of the solution in the dyeing process.

Having taken up these various points about processing dyed work in the mill, you can see now why I say that the dyer is an important man, but that some of them fail to deliver the type of dyed stock that other mills are getting. If you have common sense and can see through your own eyes, you will, with the help of the service men, change your formulas, keeping accurate records as to just what is done in each instance and doing that which is necessary to make the work run as it should. I do not see why this is not your direct responsibility just as much as putting the proper feel on finished goods, and other requirements in other parts of the mill.

The third thing that we ask you to do is to finish off each batch the same color so that it will weigh the same and run the same or better than previous lots of the same color, and I say that this is a measure of your own organizing ability in your own department, for if you can dye it right one time, why not do it again. It is true that if any color does not happen to weigh right that we can change the gears to make it weigh right, but if it does not run right there is nothing we can do.

You know as well as I do that identical batches of cotton and identical dye stuffs and chemicals processed identically are going to give practically identical shades and

will run the same throughout the mill. When the shade is off or the running quality is down, you must admit that you did not live up to your responsibility of keeping the other things identical.

Going back to what I was saying about the service men wasting your time and you theirs, a lot of the reasons why we do not get the exact performance, batch after batch, from the dye house is that our dyer does not spend as much time on the floor as he should, training, checking, and following up the performances of the second hands and laborers.

I have never seen a dyer yet but what had two or three little books with his dye formulas, etc., but how many of you have written into these books the fine details of performance which are just as necessary for the processing of the cotton as is the dye stuff formula for matching the shade.

The superintendent looks to but one man in the dye house and that is you, no excuse need to be presented about someone other than yourself brought about the substandard lot. Buck passing is out of date and the modern way is to accept personally all failures in the dye house, and to study yourself first as to why it happened. Nothing ever happens; nothing ever has happened; nothing ever will happen; something always makes it happen; and when it goes wrong the failure usually lies with the overseer. *You* did not give instructions to a man of inferior mentality to yourself so that he understood what you meant. *You* did not properly caution a man who had been careless before. *You* did not check up regularly on the temperature and *you* have not re-weighed behind your dye weigher as often as you should. In every one of these instances, it is *you*, and incidentally, some other person may have contributed to the mistake.

I accepted this invitation to speak, and although, I may have told you a lot of things about the dyeing of raw stock, I have not mentioned yarn and piece dyeing. The general principles I have laid down about dye room management applied to dyeing the other fabrics also.

Now what are you going to do about it when you get into trouble? Take the instance of a dark vat blue that gave us trouble on the cards. We were having complaints from our customer that through repeated hotel launderings the color was not holding up as it should. This was due primarily to the fact that the color was put into the yarn. We had to go to raw stock, we started off, and it was pathetic to watch our card room crowd trying to run the stock through their department. We even had to put on extra spinners to get it through the spinning frames. Our dyer would not be downed, so as soon as we had run up that lot of cotton, he had arranged with service men to come down into the mill, we put another lot through, and incidentally other lots for 18 months, and we now handle this dark blue shade just as another color in the mill. All honor to my dyer that he had the common sense and observation, brains and intelligence, to get all the outside help possible to solve this trying problem.

Circumstances beyond our control demanded that we dye more Naphthol Red yarn than we have capacity in our machines. Maybe some of you have dyed Naphthol Red Raw Stock. We never had, but realizing that we had to do it quickly too, we prepared ourselves by getting all the information possible on the subject, called in our service friends, had lots of trouble and grief with the first lots we ran, but today we can process Naphthol Red Raw Stock throughout the mill without any undue trouble.

In like manner, we formerly had lots of trouble with Vat Black Raw Stock. A few months ago our boss spinner reported that he had a lot to go through the spinning room that ran beautifully. We cannot do this on all lots, but as we did it once, we know we can do it again, and we are not going to be satisfied until every lot of Vat Black runs as well.

In talking straight to you, as I have tonight, I want you to understand that I know you are a fine bunch of fellows and do a wonderful piece of work, but possibly no better than some overseers in other departments do in their respective lines.

In telling you that you should live up to the standards in making your work run just as well as white work, and finishing all of your lots just the same, I am holding a high standard before you. I realize that I am probably offending some touchy individuals of the thin-skin type, but I want to say, gentlemen, that modern manufacturing demands modern methods, and if one mill can do it and you are not doing it, your superintendent is certainly missing a trick in not trying to develop a little more common sense and observation on your part. At least give me the courage of my own convictions to stand up and tell you this.

The more success that each and every mill has, the more every one will have, and if anything that I have said tonight can be taken back to your room, and you will study your own personality and organization and get something out of it, I will feel that what I have said has been worth the saying. So don't hold this against me in that your invited guest intimated that some of you may not be perfect.

In my own heart, I know you are not perfect and I hope that you will gain perfection by doing the one thing that modern manufacturing demands of us today; that we first get the maximum efficiency out of our own selves before trying to get it out of others.

So with this thought I leave you.

Mineral Process Oils

in the Textile Industry*

By LYMAN BILLINGS†

INTRODUCTION

VARIOUS factors in recent years have led the textile industry to investigate the properties of mineral oil products for use in processing. About five years ago the possibilities of these products were investigated by our company and a program of research was undertaken for their development. At first the problems involved in the manufacture and use of soluble mineral products were not fully realized. However, as the work progressed and experience was accumulated both of a practical and theoretical nature it was recognized that the manufacture of textile process oils from refined petroleum products involved many technical problems of selection and purification.

It is my purpose this evening to discuss some of these problems, and particularly the properties of mineral products which affect their suitability. This discussion will not take up these products as they are used, but is designed to give you the essential feature of any mineral oil product which is to be used on textiles. Some of the properties will apply to all types of work and others may apply only in certain cases. As a matter of convenience we will discuss first the mineral oil properties and second the properties of compounded mineral oil and mineral sulfonate products.

We may not have much in this paper that is new to you. It has been written as a review of the work done and the experience gained during our life as manufacturers of textile processing oils, to stimulate interest in discussion of their practicality.

Properties of Lubricants

The mineral products used today for fiber lubrication are composed essentially of mineral oils compounded with emulsifying materials. These products are used primarily in the wool and worsted industry. Their success in these particular applications depends largely upon the proper selection and blending of the ingredients involved. Various characteristics of these oils which govern their suitability include their lubricating properties and their various physical and chemical characteristics.

Lubricating

The oil to be used in such a product must above all, be capable of providing adequate lubrication for the fibers by yielding a lubricating film on their surface. Almost any mineral oil possesses excellent fiber lubricating properties, particularly as it is well known that straight hydrocarbons do not penetrate or soak into the fibers to the same extent as other oils.

Viscosity

The viscosity of the oil used is important as other properties of the oil are largely functions of it. A light oil penetrates masses of fibers quicker and more uniformly. Also, laboratory work has shown that a light oil is more easily removed from a fabric in scouring than a heavier oil of the same type. We have not determined this relation on a basis of absolute proof but our work has indicated it so strongly that we do not hesitate to state that in our opinion the relation exists. If the source of the crude and the method of refining of the oil are known, the viscosity of the oil is a measure of the boiling range and is an indication of the amount which will be lost by evaporation in the manufacturing process.

For practical purposes the oils selected have a Saybolt Universal Viscosity of between 85 and 150 seconds at 100° F. These oils have the necessary features of viscosity, boiling range and scouring ability.

Boiling Point

The volatility of the oil is very important. If this property is not controlled, the oil when used will show evaporation losses and consequent inadequate lubrication. This will result in excessive losses in the form of "fly" and poor spinning properties. If there is a large spread between the initial and the final boiling points the lighter fractions of the oil will selectively evaporate and the concentrated heavy ends will be difficult to remove from the cloth. On the other hand, if we select an oil where this spread is as small as possible we will have a minimum of light and heavy ends. These properties must be controlled in the refining process. Our experience indicates that an oil with paraffin base characteristics has the highest boiling range for a given viscosity and is, therefore, best suited for fiber lubrication.

Flash and Fire

Flash point and fire point are unimportant in fiber lubricants because they will be sufficiently high, when the boiling range is properly controlled, to eliminate any possibility of combustion. The flash point is determined by the light ends of the oil and gives no indication of the properties of the rest of the oil.

*Presented at the October 29, 1937 meeting of the Rhode Island Section.

†Socony Vacuum Oil Co., Inc.

Oxidation

Mineral oils are known for their resistance to oxidation but it is not commonly realized that amongst the various types of mineral oils there is a wide spread of oxidation susceptibility depending upon the source or chemical nature of the oil and the degree of refinement it has undergone.

When a mixture of hydrocarbons composed of large molecules oxidizes the first step in the reaction is the formation of peroxides. These peroxides further change to give in some cases decomposition and polymerization forming sludge or tar, and in others to the formation of alcohols. The alcohols can oxidize two ways further, either to form aldehydes and acids, or to form ketones and molecular splitting forming aldehydes and acids of small molecular weight and of a volatile odorous nature.

There is no way known to prevent oxidation completely. However, we can select oils in which the reaction goes the way we want it to and is as slight as possible. This consideration is of fundamental importance in the selection of the proper mineral oils for use on textiles. We certainly cannot have an oil which will develop odor on oxidizing. Also, we cannot use an oil that forms tarry resinous materials which will stain the textiles, as these stains will be very difficult if not impossible to remove in scouring. On the other hand if we select an oil which forms oxidation products of an acidic nature we will have no trouble from staining or odor. The acids formed during oxidation are nearly colorless, and actually assist in the scouring operation.

Such an oil has eluded our search for years. Recently, however, we have found an oil which seems to have properties which make it ideal for textile use. The oxidation of this oil proceeds in the direction of acid formation only.

Oxidation Tests

There are several ways of testing for oxidation susceptibility characteristics of an oil. The oil can be spread on white cloth and exposed in the fadeometer for a definite period, usually 40 hours. This will readily show the staining which will occur from the oil if it oxidizes to resinous and tarry products.

To test for possible odor formation we place the oiled cloth in a bottle with a little water. Then we close the bottle and place in an oven for 7 days where the temperature is kept at 140° F. The bottle is then opened and the odor and color of cloth observed.

Mackey Test

The Mackey Test is also resorted to. In this method oil saturated cotton is exposed to air in a chamber immersed in water at 100° C. A thermometer is inserted into the waste and the rise of temperature in the waste plotted against time. This yields a characteristic curve the highest point of which and the time necessary to reach it are taken as a measure of the rate and degree of oxidation of the oil in question. The results are always compared with those obtained with substances of known and low oxidation susceptibility characteristics.

On this test mineral oils show very little oxidation and heating and a proper grade for textile use will show none. Vegetable and animal oils on the other hand give a curve whose highest point may be over 300° C. However, the oxidation products formed from fatty oils are not of the resinous nature which is very difficult to scour and therefore are not comparable in this respect to mineral oils.

The oxidation of oils is sensitive to many catalysts such as Iron, Copper, Cobalt, and other metals. If these metals are present in an oil they promote the oxidation reaction to the peroxide stage. The peroxides formed also catalyse the reaction forming more peroxides. The decomposition and further reactions of the peroxides are not sensitive to catalysts.

Inhibitors

Inhibitors of various types can often be added to mineral oils to prevent or retard their oxidation, and a great volume of work has been done on this subject in the petroleum industry, our company being particularly active in the development of addition compounds. However, when inhibitors are used in compounded emulsifiable oils, the problem is considerably complicated. A great many of the known effective compounds tend to leech out of the oil when the oil is mixed with a large quantity of water. Others react chemically with the water and their inhibiting action is thus destroyed. Also, it has been found that the problem of inhibiting oxidation of a textile oil is a particularly difficult one as the oil is usually spread over a very great surface of fiber in proportion to its actual volume and, therefore, the tendency to oxidize is considerably accelerated. Although inhibitors have been used in textile oils in a few cases, the resistance to oxidation of the oils has largely been sought through other means, the most important of which are the evaluation and proper selection of the ingredients and the careful application of the most recent refining developments.

Properties of Compound Oils

The necessary properties of a satisfactory emulsifiable oil include the properties of the oil and those of the emulsifiable ingredients as well, and the finished product must be evaluated as such. For example, it is useless to carefully select a particularly stable and satisfactory mineral oil and then blend with it basic ingredients which are in themselves susceptible to oxidation or discoloration. It is well known that sulfonated mineral oils are frequently used as one constituent of the basic ingredient of soluble textile oils. It is not generally known, however, that the quality of mineral sulfonate with regard to oxidation stability varies to a great extent, depending upon the type of stock sulfonated, the degree of sulfonation, and the method of purification.

Viscosity

It is also true that the viscosity of a compounded product is usually higher than that of the mineral oil

constituent and may vary considerably. This fictitious or abnormally high viscosity in compounded oils is frequently not a true viscosity but is caused by the gelling effect of the compounding materials used. Such viscosities are frequently not significant as an indication of the actual usability of the product. It is best, from the point of view of laboratory control, to separate the mineral oil from the emulsifiable base and determine its viscosity.

This can usually be accomplished in the laboratory by heating the oil with strong hydrochloric acid, the separated oil being then neutralized with potassium hydroxide. The neutralized mixture is mixed with alcohol and petroleum ether and the ether layer separated and evaporated. This is the official method of The American Chemical Society.

Stability

A soluble oil must be stable in storage and the emulsifiable ingredients must be compounded so that the oil will remain clear and uniform. This feature requires very careful laboratory control during manufacturing.

Dispersion

The emulsifiable oils when mixed with water can form, depending on conditions, either oil in water emulsions or water in oil emulsions. Usually when the relative amount of water is small, less than 1 part of water to 1 of oil, the water in oil type of emulsions form. These are in the form of slimes or gels. However, when more water is added, the emulsion usually reverses forming oil in water emulsions of the familiar type. Sometimes the reverse phase water is oil emulsion will not change over when more water is added and in such cases the mixture is useless. For this reason, when making emulsions, the oil should be added to the water, rather than the water to the oil, as a matter of practise.

The particle size of emulsions can vary considerably. The oil molecules have a diameter roughly of 10^{-8} centimeters. In clear emulsions the particles must be smaller than the wave-length of light, the shortest visible rays of which are close to 10^{-5} cm. Therefore, these dispersions run about 10^{-6} cm. When the particles increase in size beyond the wave length of light or about $10^{-4\text{ to }5}$ cm. we have the bluish milky emulsion. Larger particles give white emulsions at about 10^{-4} cm. and beyond that point the emulsions may become unstable.

It is, as far as we know, impossible to obtain a dispersion of mineral oil molecules in water. The solutions of mineral oils even when clear are composed of colloidal aggregates of molecules. Whether a mineral oil forms a clear or a milky emulsion is a matter of the size of the aggregates and does not show the difference between an emulsion and a true solution.

The blue cast of fine milky emulsions is a good indication of the emulsions stability as it indicates high dispersion.

As a general rule, the more emulsifier an oil contains, the finer will be the particle size in solution.

pH of Emulsions

The pH of emulsions of soluble oils may vary within rather wide limits, depending upon various factors but, in general, most of the soluble textile oil emulsions have pH's in the range of 7-9—that is, they are mildly alkaline. This is largely the result of hydrolysis of the emulsifying agents used. Some oils which may show considerabe percentages of free fatty acids upon analysis, will actually give emulsions having a pH above 7 as a result of this hydrolysis. Other emulsions may have pH's of below 7, particularly if the water used in the preparation of the emulsion contains any appreciable percentage of dissolved salts of weak bases and strong acids.

Scouring Properties

The relative scourability of an oil with the conventional soap and alkali mixtures depends upon a number of factors such as the amount of water-soluble material present in the oil, the freedom from resinous products of oxidation, the presence of free acid or other scouring assistants in the oil, and the chemical and physical character of the scouring solution.

There has been considerable discussion in the textile industry to the effect that emulsifiable mineral oils are somewhat more difficult to remove from fabrics or yarns than the usual fatty oils. The action of a soap depends upon the hydrolysis of the soap molecule within reasonable limits, a pH of 8 to 8.5 usually giving the most satisfactory results. The pH of a soap solution is increased by the addition of alkali, the mass action supressing the hydrolysis of the soap and decreasing somewhat its scouring efficiency. If an oil is being scoured which contains free or easily saponified acids or esters, alkali assists in the scouring by reacting with these acids and effectively increasing the soap content and decreasing the mass action effect of the alkali upon the efficiency of the soap. However, in scouring mineral oils, there is little or no free acid present to be neutralized and, therefore, the amount of alkali used should be low for best results. It is, of course, recognized that a certain quantity of alkali may be necessary to obtain other results from the point of view of finishing, but it is always desirable that the amount of alkali be reduced to a minimum from the point of view of other requirements in order to achieve the most satisfactory scouring of mineral oils. For example, when a piece of white worsted cloth was oiled with approximately 10% by weight of an emulsifiable mineral oil and scoured with a 1% solution of sodium oleate, approximately 90% of the oil was removed whereas when the same cloth was scoured with a 1% sodium oleate solution to which was added 1% of soda ash, the removal of the oil was decreased to approximately 60%.

Scouring Assistants

Laboratory results and some plant tests indicate that the use of scouring assistants of the sulfonated alcohol or similar type give more efficient scouring of mineral oils

than soap and alkali alone. This does not mean that soap and alkali will not do a satisfactory job but that with assistants the scouring is improved. We have found that reducing the soap and the alkali and adding a small amount of scouring assistant gives more effective scouring without increasing the expense of the formula. In some cases savings in cost have been made.

Penetration

Rapid and thorough penetration of the stock is a necessary characteristic of any fiber lubricant. Good penetration means uniform distribution of the oil. In woolen and worsted spinning this feature shows in the uniformity of the yarn spun. In several cases where spinning tests were run with soluble mineral oil as lubricants, a definite increase in the tensile strength of the yarn has been noted. The amount of this increase varies according to circumstances. In one case it showed about 2% increase consistently and in another the increase was as high as 15%.

Finishing Oils

The products applied to textiles as finishing compounds are somewhat different in nature from fiber lubricants. These products consist essentially of mixtures high in sulfonated oil content, and give solutions in water which are clear or only slightly cloudy, and have a particle size in the neighborhood of 10^{-6} cm. as previously mentioned. This type of product has very high wetting and penetrating properties.

Finishing Properties

The properties of finishing oils on the finished textile product determine their value. They must give softness, handle, and in some cases, luster. These features of an oil must be determined empirically as there is no way to evaluate what finish an oil will give without trying it. Apparently the finish obtained from various sulfonated oils is an inherent property of the oil itself. As far as we know, no one has correlated finishing properties with molecular structure to find out why one sulfonated oil gives a different finish from another.

Sulfonated mineral oils are suitable for producing certain desirable finishes and are being used successfully in some instances to replace sulfonated fatty oils. There are some types of finishes which we have been unable to produce with sulfonated mineral oil. Blends of mineral and fatty sulfonates are on the other hand often applicable in these cases, producing finishes equal or superior to the sulfonated fatty oil alone.

Wax Emulsions

In some textile finishing waxes are used either alone or in emulsion form. When used alone as in thread finishing, a coating of dry wax on the thread is obtained by dragging the thread under wax discs. However for thread and textiles finished with sizing solutions or requiring a uniform wax distribution on the surface, emulsions of the waxes may be used.

The wax emulsions can be made from any type of wax encountered, either the crystalline paraffin waxes, the microcrystalline cerese waxes or the very hard and brittle carnauba waxes, or blends of these. When properly made such emulsions are very stable, and of uniform particle size about 10^{-4} cm.

On drying wax emulsions the emulsifying agent loses its effectiveness and the wax will not emulsify again.

The manufacture of these emulsions requires very careful laboratory control in order to be certain that the wax is all completely emulsified and that no specks of coagulated particles will appear when the emulsion is used.

Wax emulsion when added to a starch or gum finishing solution in comparatively small quantities increases the luster of the finish and adds some water repellency. It cannot be said to waterproof the fabric unless used in very heavy solutions.

For best waterproofing with waxes, the familiar mixture of emulsified waxes with aluminum salts are used.

Our work with wax emulsions in textile finishing is comparatively new but we have already found that their use produces in many cases finishes of very desirable characteristics.

These properties; lubrication, viscosity, volatility, flash and fire point, oxidation, stability on storage, and scouring ability; are we believe the essential characteristics of any mineral oil product which may be used in textile processing. Whether the product is used in fiber lubrication or in finishing, if these characteristics are not carefully controlled, troubles may be encountered. On the other hand it is equally true we believe that when proper selection and control of the products is resorted to, the results in processing will be entirely satisfactory.

Conclusion

In conclusion, our experience plainly indicates that petroleum products can be used to advantage in the processing of textiles. As yet they may be more or less in the development stage. But through the combined efforts of the petroleum and textile industries we are convinced that accomplishments can be realized which will be beneficial to all concerned.

DISCUSSION

Q. Are the mineral oil sulfonates substantive?

A. To a considerable extent, yes. That depends on the molecular weight of the sulfonic acid. The higher molecular weight acids show greater affinity for the fiber. They are not as readily exhausted as the sulfonated fatty oils, however.

Q. Are the sulfonated mineral oils generally soluble?

A. Yes. A mixture of 80-90% straight mineral oil plus 10-20% of mineral sulfonates forms an emulsion when added to water.

Q. Are paraffin base oils most satisfactory for textile finishing?

A. We believe the most satisfactory should be paraffin base oils because of great chemical stability.

Q. What is the extent of the sulfonation in the mineral sulfonates? What percent?

A. The extent of sulfonation may vary over very wide limits, and the percent of SO_3 present will depend not only upon the degree of sulfonation, but also upon the molecular weight of the hydrocarbons which have been sulfonated. It is even possible to prepare practically 100% mineral sulfonates by separating free oil and moisture.

Q. Is it practical to do that?

A. It is practical but the product would be a solid or dry powder, and it is, therefore, more expedient to market products containing considerable percentage of mineral oil in order to render them fluid.

Q. It is not a true solution, is it?

A. It is a colloidal solution.

Q. Are the mineral sulfonic acids very strong acids?

A. They are fairly strong acids. In using the mineral sulfonates, we practically always use them in the form of their sodium salt.

Q. You say you have to have them at a pH of 8-9.5?

A. That is because they a e in the form of the sodium salt. Mineral sulfonates are true sulfonic acids. The fatty acid compounds are really sulfates.

The Dyeing and Finishing of

Spun Rayon Fabrics*

ROSS M. STRIBLING

THE past two years have witnessed an increase in the annual domestic consumption of rayon staple fiber of from 6,700,000 pounds in 1935 to an estimated 47,000,000 pounds for 1937. At present plant facilities are being expanded to further increase production. Since a large portion of this amount is and probably will continue to be consumed by the weaving trades, the processing of spun rayon fabrics is of increasing interest and importance to the piece goods dyer and finisher.

The wide variety of fabrics to be handled contain spun viscose rayon either alone or in mixture with other fibers, such as spun acetate, cotton and wool, and consequently must be processed according to their properties and the ultimate effect desired.

Characteristics Of Spun Rayon As Compared With Other Fibers

A high percentage of the spun rayon produced is made from 1½ inch 1½ denier staple fiber spun on the cotton system. A cotton fiber has a natural twist or curl which causes most of the fiber ends to readily become firmly entangled with the other fibers in cork screw fashion during the spinning operation. A rayon staple fiber is generally straight and smooth so that the fiber ends do not become so firmly entangled with the other fibers during spinning. Both a cotton and a spun rayon thread present a rather hairy appearance in the gray cloth. If the gray cotton cloth is singed it will stand a large amount of friction and rough handling during wet processing without producing hairness on the finished goods; if the gray spun rayon cloth is singed the loose fiber ends present at the time will be removed but excessive tension, rubbing or other friction during processing will cause other fibers ends to spring out of the yarn leaving the finished fabric with a hairy appearance, which is objectionable in some fabrics.

Manufacturers of fiber have been working on treatments involving the use of chemicals and tension which impart roughness and curl to the fibers. Success along these lines should make the resulting fabrics less likely to become hairy. A casein fiber having a wool-like kink is now on the market.

Spun rayon, like continuous filament rayon and unlike cotton, swells, extends and loses considerable strength when wet. Rough handling or excessive tension in the wet condition may break the fibers producing hairiness and reduced strength of the finished goods.

The smooth surface of the staple fiber and the ease with which fibers slip in very soft twisted yarns make it necessary to guard against drafting the cloth warp wise or filling wise by means of excessive pulling to produce thinner and sleazier goods with an impaired effect.

Unless specially treated to prevent, staple fiber is very easily creased and wrinkled. Fortunately fabrics may be treated with synthetic resins to partially overcome this tendency.

A number of practical men with long and apparently successful experience in dyeing and finishing spun rayon fabrics hold widely divergent views regarding the best methods to employ on the different fabrics. However all seem to agree that a minimum number of treatments

*Presented before meeting, Piedmont Section, November 6, 1937.

should be used, the time of each treatment should be as short as possible consistent with good results, the points of contact in the machines should be as smooth and as free from friction as possible and tensions should be reduced to a minimum.

Fabrics constructed entirely of spun rayon may be roughly divided into two groups according to the machinery and methods employed in preparation and dyeing. Light weight, soft fabrics are processed in rope form on the machinery and in general according to the methods used for continuous filament rayon crepes. Heavy weight fabrics of the more closely woven, rugged type are generally processed at open width throughout to avoid the formation of break marks and creases that are very difficult to remove. Some light fabrics with selvages that are tight or have a tendency to curl must also be processed at open width to obtain a uniform result widthwise.

Preparation

The first treatment for both heavy and light goods, on which a hairy appearance must be avoided, is a singe over a gas flame or a hot plate.

If the warp has been sized with a starch material a desizing treatment is advisable. This may be conveniently given by placing a mangle immediately after the singeing machine, the cloth being run directly into the enzyme impregnating nip which also acts as a quench. If the subsequent processing is to be done in the rope, the goods are piled in rope form and allowed to lay for several hours. If the next treatments are to be given at open width the goods are wound on a shell at open width in which condition they are permitted to lay over night. Rope goods are next scoured in boiling soap solution and rinsed on a continuous crepe scouring machine or reel type dyeing machine. Open width goods are rinsed for several ends in cold water on a jig followed by several ends in hot soap solution.

It is considered advisable by some to give fabrics, including linen imitations and goods to be finished with synthetic resins, a treatment in dilute caustic soda solution at open width on a continuous crepeing machine or on a padder. A thorough soap scour with a hot and a cold rinse follow. If previous wet processing such as desizing has been necessary the goods should be dried and at open width. The caustic soda impregnation is more frequently given to gray cloth. This treatment produces swelling of the fibers and a tightening of the threads and cloth rendering good dye penetration and a lofty feel more difficult to obtain.

It is probable that most light spun rayons are prepared by impregnating at open width in a boiling slightly alkaline soap solution on a crepeing machine, taking out in rope form, and scouring in a boiling soap solution and rinsing on a continuous scouring machine. The entire operation requires about an hour.

Heavy fabrics are frequently prepared on a jig by giving a few ends in a hot soap bath and a brief rinse. This is practical only if the sizing material is an easily removable type.

Dyeing And Finishing Light Fabrics

Direct dyestuffs are most commonly used for plain color work, and diazo dyes, with a few suitable direct dyes, for the ground color of goods that are to be discharged and printed.

They are applied on a winch or reel type dyeing machine which should preferably be of the long, shallow type commonly used on silk and rayon rather than that of the high, short type designed for woolen goods. The smooth surface of stainless steel and Monel metal make them more suitable for a construction or lining material than wood. The back of the machine should curve in a gradual slope to the bottom so that the goods piled by the reeel will slip easily along the bottom without falling over and becoming tangled. The guide roll should be smooth and either free running or driven. The reel should be equipped with smooth metal bars. In this way friction is reduced to a minimum.

The suitably prepared goods in rope form are run on the reel machine into a warm bath containing 4-8 per cent of olive oil soap or good dyeing oil. These materials in addition to their usual function of assisting penetration and leveling also exert a lubricating action which reduces the chafeing effect of interfabric rubbing. After running for 10-15 minutes in this solution at about 120° F. the dissolved dyestuff is added and the temperature gradually raised to the boil during the next 20 minutes. Salt is added in small portions after 30 minutes dyeing time, the amount depending on the depth of color being dyed. The time required for dyeing, varying according to the weight and construction of the particular fabric, should be cut to a minimum.

The dyed goods are rinsed cold, extracted, opened to full width and dried in a loop drier. Impregnation on a mangle with a softening solution containing suitable amounts of sulfonated oil, sulfonated tallow, sulfonated fatty alcohols, dextrine, gum, glycerine etc. follow. The goods are again loop dried and framed or hot framed. Sometimes a treatment on a palmer is given. A run through a two bowl calender with a paper or other soft top roll under low pressure reduces a hairy appearance but at the same time flattens the goods. When a soft, lofty, wooly effect is wanted, impregnation with a softening solution followed by loop drying and framing is frequently sufficient. The synthetic resin finish will be discussed later.

Dyeing and Finishing Heavy Fabrics

Direct and developed dyes are the principal types used on heavy fabrics. Some vat color work is done on goods for special purposes.

The machine used for dyeing depends upon the depth of color desired. Light shades are frequently applied on a padder. Medium shades may be obtained by first impregnating the goods with color on a pad, then transferring

to a jig and running for several ends in a salt solution. Dark shades are dyed on a jig.

A jig of the frictionless type is most satisfactory but good results may be obtained on the older type jig if the operator is trained to maintain low tensions. Spreader bars should not be used unless necessary.

Previously prepared goods should be dried and framed before pad dyeing. The addition of a penetrating agent to the padding liquor sometimes helps.

Heavy spun rayons are jig dyed in about the same way as medium weight continuous filament rayons. While some attention must be paid to excessive tension, this hazard is not as serious on heavy suiting as it is on lighter materials that should be winch dyed. The addition of small amounts of soap or oil to the bath helps in securing good penetration.

After rinsing and extracting the cloth is usually dried on cans or a hot frame. Sometimes the softness of the fabric is improved by omitting the drying operation and running the extracted cloth directly through the mangle to impregnate with a solution of softening agents. Drying on a hot frame or cans follows. A passage through a small calender with a soft top roll and over a cold frame with steaming should leave the fabric with a soft, lofty handle.

Other finishing combinations are used. Some finishers like to follow framing with a palmer treatment, some object to can drying on the grounds that the finish may be baked and the goods stretched and others prefer to decatize the goods.

Finishing With Synthetic Resins

Synthetic finishes are employed principally for the purpose of overcoming the natural tendency of spun rayon fabric to wrinkle, crease and lose shape easily. Many different effects can be obtained by applying the different resins in such a way that they are precipitated in the fiber, on the fiber or on the thread. The large scale practical development of these effects would seem to offer interesting possibilities.

At present fabrics having a wool-like finish are enjoying an increasing popularity in this country. The resins most commonly and successfully used for this purpose are the urea—formaldehyde condensation products.

Goods for this process must be dry, framed to the desired width and free from sizing, finishing and other foreign materials. Dyed cloth should be tested in advance to make sure that the color will be unaffected by the treatment.

Resin may be prepared in the plant or purchased ready to dissolve in water. The solution is applied to the perfectly dry fabric on a mangle. The rolls must be set as accurately as possible and must run smoothly under high pressure. After impregnation the cloth is dried on cans and subjected to a heat treatment to permanently set the resin in the fibers. The time and temperature required for setting vary with the different resins. After framing to width and calendering if necessary the goods are ready for use.

DISCUSSION

Mr. Smith: The discussion will be led by Mr. Harry Hintze, of the Rock Hill Finishing and Printing Company, Rock Hill, S. C.

Mr. Hintze: I would like to ask what percentage of caustic soda you recommend for the treatment of spun rayon goods.

Mr. Stribling: About one and one-half to two degrees Baumé.

Mr. Hintze: For what length of time?

Mr. Stribling: The cloth is impregnated rapidly on a continuous crepeing machine or padder and may afterward set for ten minutes to one hour, but usually for fifteen to twenty minutes.

Mr. Hintze: Can you tell me from your experience whether one and one-half or even two per cent of caustic is enough?

Mr. Stribling: Yes, it should be for most purposes. It should be at least sufficient to prepare the goods for the synthetic resin finish.

Mr. Hintze: Is it treated before soaping?

Mr. Stribling: Yes, one of the principal advantages claimed by advocates of the caustic soda treatment being that it assists in cleaning or loosening from the goods any foreign materials that might act as a resist to subsequent processing.

Mr. Hintze: From my experience in treating rayon, I find it best to take a 4 per cent-6 per cent Bé solution at about 65 degrees F. and subject the rayon to this solution, up to six minutes, irrespective of the construction. It shrinks the fabric and swells the fiber.

Mr. Stribling: Does that tend to give you excessive firmness?

Mr. Hintze: No, it does not. I have run thousands of yards in this manner, but of course not on a jig.

Mr. Stribling: What type of fabric was that?

Mr. Hintz: The woolly type of spun rayon. Of course, the goods were not singed, requiring a woolly hand. You mentioned drying on cans. That is another debatable subject. I have found that drying spun rayon, or for that matter filament rayon on cans will stiffen them so they cannot be softened, no matter what you apply. I do not know whether you have found it that way or not.

Mr. Stribling: Yes, that is correct. Harshness is apt to result when the goods are can dried under excessive tension and/or at too high a temperature. In an effort to overcome this harshness, some soften the goods on a mangle, lightly calender, or even run over a button breaker. They seem to be fairly well satisfied with the results obtained.

Mr. Hintze: As far as jig dyeing is concerned, from your experience did you have any trouble with tight selvages?

Mr. Stribling: Not if the selvage is made and designed

properly for the fabric. If the selvage is good and heavy it should stand all right, but in goods where you have light and at the same time, tight selvages you will have trouble. In the latter case you can only keep your tensions as low as possible.

Mr. Klumph: Are all these goods of straight viscose type, with no acetate?

Mr. Stribling: That is right, we are leaving the acetate out.

Mr. Hooker: Is there any advantage in dyeing under the boil?

Mr. Stribling: I do not think there would be.

Mr. Hooker: How about leveling?

Mr. Stribling: There are some very level goods produced by dyeing at the boil.

Mr. Hintze: Do you use a tallow in finishing, that is, oil and tallow? What results do you get?

Mr. Stribling: Yes, to obtain a soft wooly effect.

Mr. Hintz: That is my experience as far as tallow is concerned.

Mr. Klumph: May I ask, in a water repellent type of finish, do you have any trouble with shading from front to back ends of the cloth?

Mr. Stribling: There is some. That is due largely to goods being incompletely dried, the moisture content varying from front to back ends, or to the concentration of your impregnating solution becoming diluted gradually during the run.

Mr. Klumph: What series of operations would you recommend after pre-drying the cloth before you apply your water repellent finish? What would you follow that with?

Mr. Stribling: A hot framing.

Mr. Klumph: With the Palmer ruled out?

Mr. Stribling: I should think the Palmer would be unnecessary.

Mr. Hintz: You mentioned calendering. Would a silk calendar or a cotton calendar be used?

Mr. Stribling: A silk calendar, one with a light soft top roll.

Mr. Hintze: Did you have any trouble as far as caustic spots are concerned?

Mr. Stribling: The caustic has been left out in the treatment of the goods that are referred to.

Mr. Hintze: What type of open soaper do you recommend?

Mr. Stribling: The type of open soaper that has been used satisfactorily by a mill, is in conjunction with a continuous machine ordinarily used for the preparation of taffetas etc. There are a series of baths, the goods passing over and under several submersions rollers then through a pair of rubber covered squeeze rollers after each bath. Soaping is sometimes done on a jig.

Member: Mr. Klumph asked a question about the different shades from front to back ends on cloth treated with a water-repellent finish.

I would like to know what is the greatest cause of that trouble.

Mr. Stribling: I would say the most likely cause of that difficulty would be dilution of your impregnating solution during the run due to a greater proportion of agent than water being taken up by the goods. A variation in temperature from end to end of the roll, during a setting treatment, if used, could cause that trouble.

Mr. Hintze: What type of soaper would you prefer, an open soaper or a rope type soaper?

Mr. Stribling: For light goods I would prefer the rope soaper, but heavy goods would have to be kept at the open width, otherwise break marks would result.

Mr. Cook: Does the type of open soaper you refer to have individually driven rolls?

Mr. Stribling: Yes, that is for heavy fabric. Continuous open width pretreating machines have been used.

Mr. Walker: I would like to know what is the advantage of pre-treatment with caustic of these goods.

Mr. Stribling: The pre-treatment of caustic is used to prepare the goods for an artificial linen and a wool-like finish. It aids in thoroughly cleaning the goods in preparation for a final synthetic resin treatment.

Mr. Bowles: Is it used to remove the sizing used in weaving?

Mr. Stribling: It helps in that respect and in the removal of other impurities. It also, I think, causes the contraction of the threads and makes the cloth a little firmer. That is my opinion. Mr. Hintze seems to have had a different experience.

Mr. Hintze: As far as the use or non-use of caustic is concerned; if you get the fabric which is sized with glue, in your opinion would that glue be removed simply by scouring?

Mr. Stribling: I do not think glue would be entirely removed.

Mr. Hintze: They are using a very high type glue or low type gelatin.

Mr. Stribling: They should use a high type easily soluble gelatin rather than glue.

Mr. Hintze: I am afraid there is little difference between high class glue and low type gelatin.

Mr. Stribling: That is right, but unless the goods are relatively free from glue, you would have trouble in cleaning them and of course caustic should help in loosening the glue. There are special enzyme treatments that you can use, but that is ordinarily to be avoided on account of the extra expense and time involved.

Mr. Walker: I have here some samples of spun rayon fabric which were sized with a special size and were treated for five minutes in the open soaper with caustic. I would like to submit them to you and ask you if you think that is a proper desize treatment.

Is the advantage of the caustic to produce that soft feeling, or other objectives?

Mr. Stribling: (After examining the two pieces). The

desized piece is much softer than the piece containing size. The former has a nice soft woolly feel.

Those who advocate the caustic treatment, believe that it cleans the goods for subsequent treatment and results in superior softness of the resulting goods. The speaker is of the opinion that a caustic treatment may assist in breaking a tough glue film, but believes that a good soluble size is effectively removed or broken by a good scour, resulting in a soft fabric.

Mr. Klumph: Isn't it true that the dyeing and finishing is much simpler if the goods are sized with a gelatin all the way through?

Mr. Stribling: Yes, a high grade soluble gelatin size is of advantage over glue.

Mr. Cook: Are hydraulic calendars found necessary on that work?

Mr. Stribling: You mean in the calendaring of fine goods? No, not necessarily, you want light pressure.

Mr. Cook: Is it necessary to use the heavy pressure on any of those fabrics?

Mr. Stribling: None except on artificial linen, because most of the fabrics are to be finished with a wool-like feel and heavy calendaring would tend to flatten the fabric.

Mr. Cook: You mentioned paper rolls. Did you have in mind paper covered rolls?

Mr. Stribling: Yes.

Mr. Hintze: Can you tell me, are there manufactured crepes made of spun rayon?

Mr. Stribling: Some are under development, but I do not know of any large scale manufacture of spun rayon crepes at present.

Mr. Smith (Chairman): I wonder if we could bring out any point about the dyeing of spun rayon yarns. This subject is not included, but it is a very important matter. Most of it has to be dyed before it is woven in raw stock, but I understand it has been attempted in yarns of various forms, and I wonder whether it would be all right for me to ask you what is the best method of dyeing spun rayons in yarn?

Mr. Stribling: I have seen some of it that had been skein dyed to very good advantage.

Mr. Smith: It has been attempted in packages and also on beams, with what success I am not in position to say, but I thought it might be well to bring up that point at this time if anyone here can give a little light on it.

Mr. Stribling: Some very coarse yarn has been dyed in chain form, but that would have to be very coarse *yarn*.

Mr. Smith: Would anyone like to tell us what they have heard about it? I understand it has been done to a certain extent in roving in Germany in various forms such as laps. Have you heard anything about that, Mr. Stribling?

Mr. Stribling: No, I have not heard anything about lap dyeing.

Mr. Smith: I mean before it is spun and the first operation of spinning.

Mr. Stribling: You mean dyed in between the drawing and the spinning operations?

Mr. Smith: Yes, possibly before the drawing.

Mr. Stribling: I know nothing about that. There is a good deal of it dyed in the raw stock.

Mr. Smith: I notice some of you here may have had experience on that line and I would like for you to bring out a few points.

Member: Going around I hear different things. It can be dyed with some satisfaction in the skein. Beam dyeing and package dyeing has not met with much success due to the difficulty of making even winding. That may be overcome by improvement in winding control.

Mr. Wolhar: We dye spun rayon in raw stock and find it very successful. You do not get the quantity. You have to use less quantity than raw stock cotton. Then we attempted it on beams. We dye one set and maybe lose three or four and possibly get better results in the next, but so far at Rosemary we are confining our efforts to raw stock dyeing.

Mr. Ware: We dye at Mooresville on raw stock and we have to cut down about 30 per cent from cotton in our machines, but we find it more successful to dye it in a long chain, because you get an uneven shade. The shade is very dull when you do it in raw stock.

Mr. Smith: Do you have much difficulty in evenness of dyeing from one end to the other, Mr. Ware?

Mr. Ware: No, sir.

Mr. Black: I would like to ask these people who are dyeing raw stock spun rayon if they lose much of it in dyeing? I imagine they do it in a Chattanooga machine. Do you have to break it?

Member: Yes.

Mr. Smith: Do you have any more questions?

Mr. Hintze: I would like to know whether it is advisable to dry printed rayon on cans when it comes off the printing machine, or would you prefer a tower?

Mr. Stribling: I would prefer the silk tower.

Mr. Hintze: I case you have no tower, would you make any special provisions for drying after printing?

Mr. Stribling: If you did not have the tower and had cans, you would have to use cans, but holding your tension down as low as possible on your cans.

Mr. Hintze: And hold the temperature down?

Mr. Stribling: Yes, to avoid baking.

Mr. Cook: By tower, just what do you mean?

Mr. Hintze: The tower is a drying machine in which the goods run over metal rollers. They are placed in a housing in the form of a spider's web and the loops formed by the goods get smaller and smaller and come out at the end.

Mr. Cook: It would not be very much higher in overall height than the large back cans?

Mr. Hintze: Yes, I would judge about twice the height.

Mr. Cook: You mean fifteen feet?

Mr. Hintze: Twelve feet anyway.

Mr. Cook: The tower is a series of rollers?

Mr. Hintze: When I say roller, I mean rollers about this size (measuring with hand), small.

Mr. Cook: You say you start at the outside going towards the center. How do you get the goods out?

Mr. Hintze: The goods come out parallel to the last length.

Mr. Cook: Then there is some trick in threading that?

Mr. Hintze: Yes.

Mr. Walker: Is it hot air heat?

Mr. Hintze: Some may have hot air, others may have steam coils.

Mr. Walker: Is it more like the old cell dryer?

Mr. Hintze: That style.

Mr. Smith: No fans at all?

Mr. Hintze: No fans. These towers, so far as rayon is concerned, are more or less discarded. They use them for silk in Paterson, but in New England I know only of two plants that have them today.

Mr. Stribling: It is necessary whenever you use cans on any rayon to keep your temperature down.

Mr. Hintze: As a matter of fact I recommend the wrapping of gray cloth on the cans.

Mr. Laurin: In that respect I would say that with drying over towers or over your cans you would have much better results in the tower than in cans, because in your cans you are apt to get harshness of your goods. If you are going to use cans, it will be better to lap your cans.

Some Uses of

Sodium Silicates

in the Textile Industry*

DR. WILLIAM STERICKER†

FIRST of all, what are sodium silicates? When sand and soda ash are fused together in a glass furnace, we produce a glass which looks like common window glass or bottle glass but which can be dissolved in water if it is treated with steam first. It isn't soluble if you boil it in hot water—at least not to any great extent—but if you treat it with steam before you boil it in hot water it goes in quite readily. Now, by varying the amount of sand and soda ash, sodium silicates of different ratios of sodium oxide to silica can be produced. These silicates have more silica in them than sodium oxide and they are the group which we call the colloidal silicates—1 Na_2O to 1.6 SiO_2 up to 1 Na_2O to 4 SiO_2.

About that time some sodium metasilicate was produced, but it was not until about 1930 that a commercially satisfactory sodium metasilicate came on the market. That is the 1:1 ratio and is now being produced either as a crushed crystalline cake or as individual crystals of the sodium metasilicate with 5 molecules of water. Then, a couple of years later another alkaline crystalline silicate was produced with still more alkali in it which we prefer to call the sesquisilicate, with 1½ molecules of sodium oxide to 1 of silica. Similarly, orthosilicate with 2 molecules of sodium oxide to 1 of silica has come on the market in the form of an anhydrous material—also some hydrates.

Each one of these products may have some special place in your industry. The metasilicate has found use in the kier boiling of cotton. Since you are mixing caustic soda with it, some mills prefer to use a liquid silicate. About all I can say on that subject is that the metasilicate is perhaps a little easier to handle and a little easier to weigh out, but there probably is no great difference by the time it has been in the kier a few minutes. One of the advantages of using metasilicate over the ordinary so-called 40° silicate or water glass is that it contains less insoluble matter and less impurities. For most textile purposes the use of a purified silicate of some kind is preferable. What differences are possible by using silicates in the kier? In one set of experiments one-third of the caustic was replaced pound for pound with metasilicate which increased the whiteness before bleaching by 8 per cent over that with caustic alone. After bleaching there still was a difference of 3 per cent in favor of the silicate treated cloth. We have gone on and carried that work into mills and find that the same sort of differences can be produced under commercial conditions. One of the questions that has been raised is, "Is this whiteness due to the deposition of silica?" We have treated a great many samples and feel very positive that it is not. In fact, we have yet to find a sample treated in the way which I am suggesting here which shows a higher silica value or even as high a silica value as the raw cotton.

* Presented at meeting, Philadelphia Section, January 14, 1938

† Development Chemist, Philadelphia Quartz Company.

While I am speaking about kiers, I think most of you are acquainted with kier lining with silicate followed by treatment either with Portland cement or with Epsom salts solution. The silicate is first painted on the kier and this is treated either with the cement or a 10 per cent solution of Epsom salts. The use of white Portland cement which is now on the market is suggested because we have a few cases where the ordinary Portland cement gave iron stains on the cloth which was resting directly against it.

The next most important textile use is the bleaching of the various textile fabrics and with the growth of peroxide bleaching has come the growth of silicate addition in that bleaching. There seems to be a combination between the silicate and the peroxide, in fact we know that the metasilicate will crystalize with one hydrogen peroxide of crystallization, so that we have a compound which is stable. I had for a number of years a sample of that compound which stayed in that condition without loss of oxygen. Somewhat that same effect apparently takes place in a bleaching solution. If we take a purified silicate we can get a stable peroxide bath. This is particularly of interest where standing baths are held as in the silk and wool industry. Cotton bleaching is usually one with a single bath where the small amount of impurities in the ordinary silicate is less important and some people prefer to use the ordinary silicate for that operation because it is somewhat cheaper. However, tests that we have run indicate that the final whiteness of the cloth is not as great. In other words, you do not get as good bleaching with the same amount of peroxide and it is a question whether you have saved any money in the end. A test on cotton bleaching was run in one of the mills, using what we believe to be the highest grade of silicate available. A whiteness of 95 per cent was obtained. Starting with the same total hydrogen peroxide, the same cloth and the same total alkali and silica, the last two furnished as good a grade of silicate, but not quite as good, we got 89 per cent whiteness—in other words, a difference of about 6 per cent in the whiteness. We also in that same series of tests ran a little lower peroxide. The initial concentration of peroxide, given as milliliters of potassium permanganate, was 1/13 less and with the good silicate we got a little better—about 3 per cent better bleaching—than we got with the full amount of peroxide with the poorer silicate.

Now, the difference in those silicates is apparently in the iron and titanium impurities. Iron is pretty generally recognized as being a catalyst for the decomposition of peroxide. The action of titanium apparently is less recognized and many people do not test their materials at all to find out whether they contain titanium. As far as I can learn, and this is a place where we would like to have more research, the effect of titanium is greater than that of iron and all of the materials that go into the bath should be tested for this impurity. Now, I will say this, that I do not know of a single silicate solution on the market which is entirely free of either material. The best we have been able to do is to produce one which is very low in those two materials. Since the sulfocyanate and ferrocyanide tests for iron are very sensitive, they almost always give a reaction. An exceptional sample of silicate may not show any color with the sulfocyanate test, which is the more sensitive.

Magnesium is a helpful impurity; in fact, some people have added Epsom salts to the bleaching bath.

With the introduction of the metasilicate in the convenient form, we were able to sell silicates for many textile purposes which perhaps previously were not unknown, but at least were little used. One of these is soaping off prints. We have been quite successful in soaping off rayon and cotton prints with a mixture of equal parts of sodium metasilicate and soap, adding enough to get a good foam on the soaping-off bath. There are a few dyes which are not fast under those conditions but let me call your attention to the fact that the same operation is used in the laundries and if they are not fast here, they will not be fast when you sell them. Therefore, unless you are putting out a very cheap product and don't expect to have repeat orders on it, this is a pretty good way to test whether your materials are satisfactory. One chain of stores who tried this out put into their specifications that all their goods must be soaped in this manner. Their tests included the use of a 5 per cent solution of metasilicate with some soap in it. Even this did no harm and they found lower concentrations improved the color and the contrast with the white so greatly that they felt the treatment was worthwhile.

The silicates are also used to improve discharge printing where the slightly yellowish tinge can be taken out by the use of the silicates in the discharge bath or in a separate bath following the discharge bath. There even have been cases where silicates have been used in printing pastes.

Then, with the growth of the rayon industry, we have found that scouring rayon is very nicely done with metasilicate and soap. Our experience leads us to believe that metasilicate is the best of the ordinary soap builders, both in point of view of what they do and from point of view of total cost since there is a larger saving of soap than with any other material.

In shrinking rayon, caustic has been used generally. Laboratory experiments, which have not yet been confirmed on a plant scale, have indicated that we can get about 20 per cent shrinkage with metasilicate. One of the questions which was raised in that connection was, will the use of the silicate in these baths or in the scouring bath prevent the use of direct dyes in the same bath? We undertook quite a series of experiments and found that it would not affect direct dyes which were relatively fast to alkalis. There are only a very few colors which are affected. Another use in the rayon industry, this time in the manufacture of rayon, is as an addition to the

desulfurizing bath where the use of a small amount of silicate, about one-half as much silicate (ratio 1:2.5) as sodium sulfide, gives a much longer life to the desulfurizing bath and tends to prevent precipitation of the sulfur on the goods.

About the time that we thought we had the rayon scourers started, along came the acetate mixtures and immediately they said, can we scour an acetate-rayon mixture without affecting the acetate? Again we had to go back to the laboratory and we tried a long series of experiments. We were rather surprised that the least alkaline silicate, which has a 1:4 ratio and the lowest pH and would be expected to have the least effect on an acetate, was not the best. Actually, we found, however, that a silicate, intermediate between the metasilicate and that one, was the safest. That was an especially purified silicate and we found that with it we could run relatively high concentrations, provided the temperature did not exceed 140° F., without injuring even bright, clear acetate. Even the metasilicate at lower concentrations, such as were used in scouring bath, were not dangerous if the ordinary scouring time of about 20 minutes and the temperature of about 140° was not exceeded.

We just about told them it was safe when they came along and said they did not care. They now wanted to get rid of some of the acetate on the surface so that they could dye with direct dyes or discharge dyes from the surface. I said, why on earth do you start out with a material that has a higher value and start taking it back towards the regenerated cellulose and when I first asked it, nobody seemed to be able to answer. They blamed it on the converter and various other people but the answer seems to be that with the conversion you retain a certain hand which is highly desirable. You also retain, because you only saponify a small portion of the acetate, many of the advantageous qualities of the acetate and you make it possible to dye easily and to discharge in discharge printing.

So, our next job was to take the acetate and see what we could do on those. The metasilicate does not work very well, so we had to take a step to the next more alkaline silicate and work out two or three processes in the laboratory. Then I went to Paterson and was lucky enough to find a dyehouse which was willing to risk some acetate in my hands. We found that a combined dyeing and saponification could be carried out which left the desirable hand and which enabled them to work with their direct dyes as they wished. This dyehouse has had no trouble with any dye. A few of them changed color in the strongly alkaline solution, but the color of the cloth after washing was the same as if the alkali had not been present. There are further advantages of the saponification in that it makes the cloth ironproof so that if an electric iron, particularly, gets a little too hot the cloth no longer melts and forms a continuous film.

What will the next problem be? Already the laundries are having trouble when they wash some of the resin-treated cloths. They don't come out of the wash wheels in good condition. Each step the textile man takes, brings us new problems.

Now, what about the wool industry? It is the last one that we have really done very much on except for bleaching. In connection with bleaching, it has been a tradition, due to the fact that the wool bleacher has used the wrong silicate, that wool bleached with peroxide and silicate takes up silica and is unsatisfactory. There is within twenty-five miles of Philadelphia a concern that had a little more courage than some of the others and they started out to bleach wool with silicate and peroxide and ran a continuous bath. They ran the bath for about six months with daily additions of peroxide and silicate to maintain a given concentration of oxygen and of alkali. We ran tests on the wool to find out if the silica had been deposited. We found none but did discover that the wool bleached with the silicate and peroxide stayed white for a much longer time than that bleached with ammonia and silicate. I think maybe that encouraged us to try silicate in wool washing.

Of course, we were trying to find uses for metasilicate when it first came on the market but metasilicate is not satisfactory for wool scouring. It burns the weathered ends of the wool. More recently we have found that the ratio of one sodium oxide to two silica when mixed with soda ash, saves soap and apparently gives a more uniform scouring and a wool which dyes much more evenly. We have only one mill that we can point to so far but they are very well satisfied with it and believe that that is the answer to wool scouring. I have, at present, about thirty samples of wool in the laboratory which I hope some day to work on in an attempt to find out just how far we can go with this, and perhaps convince some of our good friends that it is a good thing for customs scouring as well as for concerns doing dyeing.

Then, we have one more use for silicate in the textile industry, particularly in the production of rayon, and that is the prevention of corrosion in mills. An initial concentration of not less than eight parts per million of silica in the form of a soluble silicate is added to the water. Dosages have gone as high as forty-five parts per million. Those concentrations will prevent rust formation by forming a very thin, self healing coating on the inside of the pipe. The treatment may be either continuous or intermittent, but preferably continuous, and in most cases the concentration can be reduced after about three months. The film forms rather slowly, taking thirty to sixty days, and takes at least that long for it to come off.

The hour is getting late and there may be some questions, and there is another speaker, so I am going to let you ask questions if you wish and then turn the floor over to the next speaker.

DISCUSSION

Q. When you speak of bleaching what method would you use to determine the degree of whiteness?

A. The method of determining it was to use a Hess-Ives Tint Photometer which we have in the laboratory.

Q. Is this instrument equipped with a photo-electric cell?

A. No. However, although less accurate, we believe the results are relatively the same as we would get with a photo-electric cell.

Q. At what pH does silicate, orthosilicate or metasilicate best stabilize a 1 to 1½ volume standing bath of peroxide?

A. The best pH apparently, and I am going to say this with some caution because pH measurements in a peroxide bath are not particularly accurate, would be between 9.5 and 10.

Q. You spoke of catalysts that promoted decomposition in the bath and you seemed to stress titanium, isn't copper one of them?

A. Copper is a very bad one but it doesn't happen to occur in the silicates. Copper is worse than either of the two mentioned.

Q. Have you had much experience with the silicates in connection with the sulfated alcohols, Gardinols, etc.?

A. We ran quite a series of tests on those and some of the sulfonated and sulfated alcohols will work with the silicates. In general, they are the ones that are recommended for use in alkaline solutions. Some of them are not at all satisfactory and work better in the acid range or in a neutral range.

Q. What are the advantages of having some magnesium in the bath for bleaching cotton?

A. Magnesium silicate has been found to be a particularly good stabilizer of peroxide. Of course, you don't want the bath too stable or you will never get any bleaching. In Germany, one concern is making a magnesium silicate for use in such baths. I would like to point out that there have been a great number of adverse references to the use of silicate in bleaching baths. The reason for that is that the Germans use a grade of sand which in this country we would think was totally hopeless for the formation of sodium silicates, and they simply filter it to get rid of insoluble matter. They don't actually purify it and leave large amounts of iron and titanium in the silicate solution; that is the reason for most of the poor results which have been reported from Germany.

Q. Referring to the ratio of caustic to silicate in bleaching, there seems to be some mysterious ratio and if you hit that ratio you get the ultimate in the bleach. What is there to that?

A. I don't know whether it is true or not. I will say this that we find that certain silicates give much better effects than others. One of the big peroxide manufacturers, when the metasilicate first came on the market, tried a series of experiments in which they added caustic to a purified liquid silicate and to the metasilicate getting the same pH in one case and in the other, making it up to the same total alkali. In both cases, they found that the metasilicate plus caustic gave a harsher cloth of poorer color than the purified silicate of the liquid type. Weber in England claims that soda ash should never be used with silica in peroxide bleaching and puts up a very good story for it. On the other hand, soda ash has been used quite satisfactorily in place of caustic and with good results. Apparently if you want quick bleaching you must have a silicate ratio, particularly with cotton, which is above the metasilicate ratio and that has caused us some trouble because sometimes the caustic was not very pure. I think in general they run about a 10 per cent excess over the metasilicate ratio.

REPORT, NORTH CAROLINA STATE COLLEGE STUDENT SECTION

THE Section has been addressed recently by Mr. Eric T. Laurin, Director of Textile Service for Calgon, Incorporated, who discussed and demonstrated the uses of Calgon; and by Mr. W. S. Sims and Mr. Jack Schandler of the Charlotte office of Geigy Co., who demonstrated dyeing of acetate yarn with aid of alcohol, and showed the advantages of the same colors in cross dyeing.

Respectfully submitted,

J. A. Holder, Jr., *Secretary.*

MEETING, PHILADELPHIA TEXTILE SCHOOL STUDENT SECTION

A REGULAR meeting of the Philadelphia Textile School Student Section was held on Friday, April 8, 1938, at 4:00 P. M. Due to illness of Chairman Wayne Fry, the Secretary presided.

Dr. Sivert N. Glarum of Röhm & Haas Co., Inc., delivered an interesting talk, his topic being "Vat Printing Pastes."

Respectfully submitted,

Robert Roecker, *Secretary.*

MEETING, NORTHERN NEW ENGLAND SECTION

A MEETING of the Northern New England Section was held at the Andover Country Club, Andover, Mass., on Friday, April 1, 1938 with sixty members attending the dinner and 90 attending the technical meeting which followed.

"Wool" was the subject of the meeting, and papers were presented by two of the Research Associates of our organization. Mr. Bertil A. Ryberg, A.A.T.C.C. Research Associate at Lowell Textile Institute presented a paper entitled; "An Investigation of the Ether Extract obtained from Commercially Clean Wool". Dr. Milton Harris, A.A.T.C.C. Research Associate at the National Bureau of

Standards spoke on "New Methods for Studying the Chemical and Physical Properties of Wool". Both speakers gave an excellent account of the fundamental research sponsored by this association. Dr. Harris' paper aroused considerable interesting discussion regarding the application of his excellent work to industrial processing.

Respectfully submitted

JOHN N. DALTON, *Secretary.*

MEETING, PHILADELPHIA SECTION

THE last regular meeting of the season of the Philadelphia Section was held at the Penn Athletic Club on Friday, April 22nd, our Chairman Herbert S. Travis presiding.

The technical subject of the evening was "Detergency" which was broken down in three sections.

"The Factors Contributing To Detergency" was discussed by Dr. L. P. Hall, Research Chemist of Rohm & Haas Company Inc., and illustrated by slides.

"Additive Effect of Builders To Detergency" was discussed by Mr. J. F. Oesterling, Research Associate of the Pennsylvania Laundryowners Association.

"The Value Of Synthetic Organic Products" was discussed by Mr. Harold F. Jones of the Technical Laboratory of the Dupont Company.

Following the speakers of the evening Mr. Arthur E. Jones showed motion pictures of the last Olympic Games which were held in Germany, through the courtesy of our Councilor, Mr. R. M. Ritter.

The usual informal dinner at which 76 were present preceded the meeting, while 130 attended the meeting.

The Section's Annual Outing will be held on Friday, June 10th, at Whitemarsh Country Club.

Respectfully submitted.

J. P. CONWAY, *Assistant Secretary.*

SPRING MEETING, SOUTHEASTERN SECTION

THE Southeastern Section held its regular spring meeting at the Hotel Dempsey, Macon, Georgia, on Saturday evening, April 23, 1938. There were 125 members and guests present at the dinner.

The meeting following the dinner was called to order by the Chairman, Mr. Robert W. Philip, at 7:30 P.M. He introduced the members of the executive committee and the officers of the section to the assembly. The Secretary, Dr. Macormac, then made a report which included announcements of coming meetings of the South Central and Piedmont Sections, and a report of the meeting of the sectional executive committee on Mar. 19. He also stated that at present the membership of the section was 110 and that plans for future meetings included one in Columbus, probably on Sept. 10, and another in Atlanta about the first of November. Mr. Philip then introduced several visiting members from other sections and called on the Vice-Chairman, Mr. Allen Jones, as chairman of the membership committee, to introduce the ten new members whose applications had been received that evening.

There being no further business to come before the meeting, the Chairman introduced Mr. L. E. Whittelsey, of the Bibb Mfg. Co., who presented his prepared paper on "The Fundamentals of Dyeing Rawstock Uniformly". This was followed at 8:15 by a twenty-minute sound movie depicting the employees of the Avondale Mills at work and play. The program was concluded by an extremely humorous exposition of the trials and tribulations of an executive in a colored goods mill by Mr. Hugh Comer, Vice President of the Avondale Mills. During this talk Mr. Comer emphasized the, to him, surprising facts that there are at least 15 shades of indigo, that although mills may have several hundred shades of brown, none of them are the correct brown to be used in yarns for braiding shoelace, because they do not have the correct "tone".

The meeting finally adjourned at 10:30 P.M. The committee in charge of this meeting consisted of Curt Mueller, of Bibb Mfg. Co., Chairman, F. L. Asbury, P. N. Collier, and L. E. Whittelsey.

Respectfully submitted.

A. R. MACORMAC, *Secretary.*

MEMBERSHIP, MAY 1, 1938
(and comparison with May 1, 1937)

	Active	*Junior*	*Associate*	*Student*	*Totals May 1st.* 1938	1937
Northern New England	238	37	36		311	303
Rhode Island	211	36	26	11	284	256
New York	367	37	47		451	409
Philadelphia	295	37	37		369	326
Piedmont	190	25	32		247	238
South Central	48	6	2		56	41
Southeastern	66	6	26	11	109	55
Mid West	130	9	17	2	158	147
Lowell Textile Institute				19	19	11
North Carolina State College				10	10	5
Philadelphia Textile School				28	28	25
No Section	50	8	6	1	65	55
Totals	1595	201	229	82	2107	1871
Corporate					30	30
					2137	1901

HAROLD C. CHAPIN, *Secretary.*

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary or the American Dyestuff Reporter any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.

Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-4

Education—University of South Carolina, New York University, Philadelphia Textile School.

Experience—Chemist for 3 years with dyestuff company; 1 year as chemist in dyeing plant on pure and tin weighted silks and rayon; 3 years plant chemist for cotton dyeing, printing and bleaching plant.

Married; age 30; references. Prefers Metropolitan area but will go anywhere.

A-B-1

Education—Graduate chemist and colorist from a leading textile institute. Speaks French fluently. High standing at school. Awarded 1st prize in chemistry. Member of honor society.

Experience—Knowledge of most processes of textile manufacturing and some experience in woolen and worsted piece and stock dyeing and color matching. Knowledge of finishing. Wishes to get into laboratory or dyehouse.

A-B-7

Education—Evening school in textile dyeing and chemistry.

Experience—Dyehouse laboratory for 2 years. Foreman dyer and finisher on hosiery for 9 years. Experience on ribbons also vat dyes on rayon and silk skeins. 2 years assistant to superintendent. Desires position either in demonstrating and sales or dyer. Age 31; married.

A-B-C-4

Education—Educated abroad.

Experience—Twenty years experience in the textile field as bleacher, dyer, finisher and chemist. 16 years in charge of dyestuff laboratory of large dyeing plant, 4 years as chief chemist with large bleachery. Has tested dyestuffs, and chemicals used in the textile field and has manufactured soaps and textile specialties. Has handled all textile fibers; bleaching, printing, dyeing and finishing same. Has done pigment and lacquer printing, waterproofing and fireproofing. Reason for leaving last position was due to business conditions.

Age 41; married.

A-B-C-5

Education—High school textile school graduate (textile school of Barman, Germany).

Experience—8 years skein and ribbon dyer; 2 years chemist-colorist laboratory work in Germany. 10 years boss dyer and superintendent for finishing in leading ribbon mill. German; American citizen; married; 40 years of age and willing to go anywhere.

A-B-C-6

Education—English Municipal School of Technology; Board of Education, So. Kensington Chemistry Certificates; City & Guilds of London Institute in Bleaching and Dyeing.

Experience—In U. S. A. 22 years as chemist and chief chemist with one of the largest textile plants in the country; expert colorist; long experience with permanent and semi-permanent finishes. Specialist on vats, naphthols and indigosols. Age 49; married.

A-B-C-7

Education—B.T.C., Lowell Textile Institute, member of honor society; speaks French fluently.

Experience—3 years as textile research chemist in charge of dye house and advisory to purchasing for large Canadian plant. Experienced in woolen and worsted yarn dyeing, for weaving and knitting; raw stock, top dyeing, piece goods dyeing and finishing. Laboratory practice in planning and checking methods and processes, costing and purchasing. 1 year experience as assistant dyer in top dyeing and print works. 1 year as chief chemist in cotton mill in charge of laboratory and control work of vatcolors, naphthols, sulfur and developed colors.

Married; age 28; references; American citizen; will go anywhere; desires opportunity to prove capacity.

A-B-C-F-1

Education—Textile institute course; extension work at Brown; executive training with Alexander Hamilton Institute; knowledge of German.

Experience—Dyeing executive in all types of textiles, including stock, yarns, and piece-goods. Thorough knowledge of all classes of dyes and dyestuffs, and their successful practical application in the plant. Wide experience in all types and makes of equipment used in dyeing, bleaching, mercerizing and finishing. Laboratory practice in planning and checking methods and processes, costing and purchasing. Good manager personnel for efficiency and satisfactory results economically obtained. Cotton, rayon and silk, some acetate rayon, and mixed fabrics. Age 46; excellent references; in excellent health.

A-B-C-F-2

Education—Lowell Textile Institute, 1911.

Experience—26 years in cotton yarn and piece goods finishing plants; expert on naphthols, vats and other cotton and rayon dyeing; all types of control work and testing; analytical processes; purchasing of dyes and chemicals. Age 46; excellent references; in perfect health; will go anywhere; married.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following: rayon, cotton backs, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-4

Experience—Foreman dyer in charge of ribbon dyeing for 20 years. Experienced on silk, cotton, rayon, acetate yarn. Age 41; will go anywhere.

B-5

Education—High School and Textile School Graduate.

Experience—Twelve years overseer of dyeing on directs, vats, naphthols, sulfur, basic and developed colors. Also experienced bleacher. Age 40; married; references.

B-6

Education—Textile School Graduate.

Experience—Former instructor in chemistry and dyeing. Twelve years' experience as overseer of dyeing of vats, naphthols, developed, indigosols, sulfur and direct colors on piece goods. Age 35; excellent references.

B-C-1

Experience—20 years experience in dyeing and finishing departments; 15 months as general superintendent of well known woolen mill. Capable of handling dyeing alone or in combination as superintendent of dyeing and finishing.

Age 40; references.

B-C-2

Experience—12 years foreman piece dyer on vats (pigment), naphthols, soluble vats, sulfurs, developed, basics and directs. Pads, jigs, boxes and continuous machines. All constructions of cottons and rayons. Full practical knowledge of bleaching,

mercerizing, and working knowledge of most finishes and finishing machinery. Could take charge of entire wet processing.
Age 38; married; references.

B-D-1

Education—Received early training in England and attended technical college there.

Experience—Dyeing executive; all types of ladies and men's hosiery and all types of textiles including stock, yarns, piece goods and government uniforms; woolen and worsted suitings; cotton, silk and rayon on yarns, piece goods and mixed fabrics; thorough knowledge of all types of dyes, successful application of same and laboratory work. Fourteen years with one employer; business conditions, reason for unemployment.

Age 52; married; English American; sober and reliable. Desires position as dyer or demonstrator and service man for dye company.

ANNUAL MEETING AND CONVENTION

DECEMBER 2 and 3, 1938

ATLANTA, GA.

Headquarters: Atlanta Biltmore Hotel

LAPEL BUTTONS

A new supply of lapel buttons in 10 Kt. gold, bearing the seal of the Association, is now ready. Orders from members in good standing, accompanied by price of $1.50, may be addressed to the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. Please make checks payable to "Secretary, A.A.T.C.C."

TRADE NOTES • NEW PRODUCTS

OBITUARY

DONALD M. GILES

Donald M. Giles, President of the Giles Dyeing Machine Company, died at Graduate Hospital, Philadelphia, Pa., on April 27, 1938.

Mr. Giles was born in 1890 at Amsterdam, N. Y. He attended Massachusetts Institute of Technology and was graduated in 1913. Mr. Giles became associated with his father in Giles Dyeing Machine Company in 1913 and has been head of the firm since 1931.

He is survived by his wife and one daughter, both living in Abington, Pa., a sister Doris Giles and brother John M. Giles, both of Germantown, Pa.

• TEXTILE FOUNDATION RESEARCH PLAN

At a meeting of the Board of Directors of the Textile Foundation held in Washington recently, it was decided to concentrate the future work in scientific research on studies of those fundamental problems which are basic to the entire industry. To this end, allotments of funds have been made on a long time basis and a group of advisors has been appointed to plan and establish the scientific research program. Dr. R. E. Rose, director of the Dupont Technical Laboratories at Wilmington, is chairman; the members are Dr. Harold DeWitt Smith of A. M. Tenney Associates, New York; Mr. Alban Eavenson, Eavenson and Levering, Philadelphia; Dr. H. S. Taylor of Princeton University; Dr. Warren E. Emley, National Bureau of Standards; and Dr. A. G. Black of the Department of Agriculture.

A large part of this work will be done at the National Bureau of Standards, but certain fields have been set aside for Lowell Textile Institute, Massachusetts Institute of Technology and Yale University.

The Textile Foundation was created by Act of Congress and its purpose is for economic and scientific research for the benefit of the Textile Industries. The members of the Board of Directors are: Franklin W. Hobbs, Boston; Frank D. Cheney, Manchester, Conn.; Stuart W. Cramer, Cramerton, N. C.; the Secretary of Commerce and the Secretary of Agriculture.

• TEXTILE INSTITUTE DELEGATION

The Textile Institute, with headquarters in Manchester, England, and with members all over the world, including 56 in the U. S., is sending a delegation composed of Frank Nasmith, President Elect and J. R. S. Goodall, Chairman of the diplomas committee, to the U. S. during the last week in May and the first week in June. The purpose of the delegation is to contact the American members and the various technical textile organizations in this country who are interested in testing and research with a view to developing closer cooperation between the English society and similar American organizations. They wish also to test out the sentiment of American members with regard to the organization of an American Section and to study the possibility of instituting the examination system for the diploma for Textile Technologist which distinction has attained recognition throughout the world.

The Textile Institute has lately broadened its activities to include work on standardization of test methods and the delegates will be very interested in meeting the groups concerned with test methods and tolerances in this country.

At the request of the Textile Institute arrangements for entertaining the delegates are in charge of a provisional committee of American members of which Harold D. W. Smith of A. M. Tenney Associates, Inc., is Secretary. Other members are: Herbert J. Ball, Lowell Textile Institute; William H. Cady, U. S. Finishing Co.; R. L. Chisholm, Universal Winding Co.; Daniel E. Douty, U. S. Testing Co.; Franklin W. Hobbs, Arlington Mills; A. R. Olfin, Kendall Mills; B. Parsons, Pepperell Mfg. Co.; A. M. Tenney, A. M. Tenney Associates, Inc.; Douglas G. Woolf, *Textile World*.

The exact program will be available as soon as arrangements can be made for the various meetings. The tentative plans include a welcoming luncheon with the American members of the Textile Institute in New York and the committee hopes to arrange meetings with the officers or officers and members of the various technical textile organizations including U. S. Institute for Textile Research; American Association of Textile Chemists and Colorists; American Association of Textile Technologists; Textile Committee D-13, American Society of Testing Materials; Textile Division of the American Society of Mechanical Engineers; American Standards Association and also visits to government laboratories, including the Bureau of Standards and the cotton laboratory of the Department of Agriculture in Washington. If time permits, visits will also be made to several of the textile schools in both the North and South.

• MEETING, TEXTILE SCHOOL DEANS

The Deans of the twelve textile schools, meeting in semi-annual conference at Raleigh and Southern Pines, were welcomed to North Carolina by the Governor of the State, Hon. Clyde Hoey, at a luncheon given in their honor by Dean and Mrs. Harrelson of North Carolina State College, and Dean and Mrs. Nelson of the Textile School of that College. Other guests included Mr. Franklin W. Hobbs of Boston, Chairman of the Textile Foundation; Mr. Stuart W. Cramer of Cramerton, Treasurer of the Foundation, and Mrs. Cramer; Mrs. Hoey; Dr. Frank P. Graham, President of the Univehsity of North Carolina, Mr. and Mrs. Wm. McLaurine of Charlotte; Mr. and Mrs. C. S. Tatum of Raleigh, Mr. Frederick M. Feiker of Washington, Director of the Educational Program for the Foundation; and Dr. John A. Randall, formerly President of the Rochester School of Mechanic Arts.

After visiting the Style Show and Textile Exposition at North Carolina State College, the deans proceeded to Southern Pines for a two-day conference.

Mr. Feiker, opening the first session, expressed the regret of the members over the illness of Edward T. Pickard, Secretary of the Textile Foundation, under whose leadership this textile education movement has progressed.

Mr. Randall spoke to the deans on "Trends in Vocational Education". He said the belief is growing that vocational education must be reorganized and expanded to supply the types of specialists needed in industry. Mr. E. F. J. Lynch of the Bureau of Chemistry and Soils, Department of Agriculture, talked on "Recent Trends in the Development of Agricultural Fibers", particularly with reference to rayon. Questions concerning other fibers brought forth general discussion.

Dr. A. H. Williams of the Wharton School of Finance and Commerce of the University of Pennsylvania, who has had prepared under his direction at the Wharton School, text books on Textile Economics, under the sponsorship of the Foundation, presented one of the finished books and led a discussion of the best methods of getting them into the hands of the students and others interested in this subject. The titles of the books are: "The Textile Industries—An Economic Analysis"; "Management of a Textile Business"; "Textile Costing—An Aid to Management"; and "Textile Marketing". These may be procured through the office of the Textile Foundation, Commerce Building, Washington, D. C.

Dr. H. H. Willis of Clemson College, Clemson, S. C., has prepared for use in the textile schools, a series of technical text books entitled "Cotton Carding", "Cotton Picking", "Roving Frames", "Drawing Frames", and "Cotton Spinning" which may be procured through Dr. Will s at Clemson College.

The deans were fortunate in having at one of their sessions the heads of some of the textile mills in North Carolina; Mr. C. S. Tatum of Pilot Cotton Mills of Raleigh, Mr. Sidney S. Paine, of Tarbardrey Manufacturing Company of Greensboro, and Mr. Carl R. Harris of Erwin Mills, Durham. They discussed "What the Mills Expect from Textile School Graduates". Mr. Harris, being a graduate of a textile school, gave his experience in what the textile graduate needs to better supply the demands of the industry.

The deans in attendance were:

E. W. France, Philadelphia Textile School; Chas. H. Eames, Lowell Textile Institute; Henry W. Nichols, Bradford-Durfee Textile School; George Walker, New Bedford Textile School; W. D. Fales, Rhode Island School of Design; Wm. H. Dooley, principal of New York Textile High School; Thomas Nelson, North Carolina State College; H. H. Willis, Clemson College, C. A. Jones, A. French Textile School, Georgia School of Technology; E. W. Camp, Alabama Polytechnic Institute; J. B. Bagley, Texas Textile School, and M. E. Heard, Texas Technological College.

● S.C.I. OFFICERS

The American Section of the Society of Chemical Industry announces the election of the following officers for the year 1938-39.

Chairman: Wallace P. Cohoe; Vice Chairman, Lincoln T. Work; Honorary Secretary, Cyril S. Kimball and Honorary Treasurer, J. W. H. Randall.

The following new Committee members were elected to take the place of retiring members.

James G. Vail, R. L. Murray, A. E. Marshall, N. A. Shepard and D. P. Morgan.

The Annual Meeting of the Parent Society will be held in Ottawa June 20-22 and all chemists are invited. A large delegation from the British Isles is expected.

● ANNUAL MEETING, U. S. I. T. R.

The adjourned annual meeting of U. S. Institute for Textile Research, Inc., to be held at the Hotel Pennsylvania, New York, N. Y., Tuesday, May 24, will be followed by a luncheon in honor of Frank Nasmith, president, and J. R. S. Goodall, chairman, diplomas committee, of The Textile Institute, Manchester, Eng. There will also be a conference in the afternoon confined to the 50 co-operators in U. S. Institute's research on textile drying that has been in progress since last Summer at the National Bureau of Standards, Washington, D. C.

At the adjourned annual meeting directors and officers will be elected, proposed amendments to the by-laws will be acted upon, and Acting-President, Dr. E. H. Killheffer, will report plans for the more efficient operation of a textile research institute.

Messrs. Nasmith and Goodall, who will be honored at the luncheon, will be visiting this country as an official delegation of The Textile Institute to survey the possibilities of increasing its activities here. It has a membership in the United States of over 50, a majority of whom are also members of U. S. Institute for Textile Research. Dr. Harold DeW. Smith, a member of both bodies, heads a committee of members of The Textile Institute in this country which is making arrangements for the entertainment and itinerary of the official delegation. Members of The Textile Institute who are not also members of U. S. Institute will be accorded the privilege of attending the luncheon on the same basis as the latter.

The Textile Institute differs from textile technical bodies in this country in that it conducts examinations leading t the award of diplomas and to the degree of F.T.I. (Fellow of the Textile Institute). It does not engage in research, but its official journal is the leading English textile research publication, to which the British textile research associations contribute abstracts and occasional released research reports.

● ARIDYE PRINTING

A "streamlined" method of textile printing, which uses entirely new printing materials, is announced this month by the Aridye Corporation, Fair Lawn, New Jersey, a subsidiary of Interchemical Corporation. It is claimed that this development makes it possible to print with more sharpness of detail on a variety of materials.

Formulations are being adapted to decorate nearly any type of cloth including cotton, wool, silk, acetate rayon, rayons, metallic weaves, and most types of mixtures. Mill runs on shirtings, acetate rayon, and silk have already been made by several large printers.

According to the manufacturer, Aridye printing provides exceptional clarity of detail and finer tonal gradations. New and unusual color effects may be achieved with the process.

Aridye colors differ substantially from those now in general use in the textile field. They have no chemical "affinity" for the textile fibers, but rather, they effect a mechanical anchorage. When printed, the colors are said to show unusual fastness to light and to washing. Some shades, used for shirtings, withstood 300 Fadeometer hours without fading, it is claimed.

Formulations are varied to get the degree of penetration required. With this penetration control, colors may be printed on one surface, on both sides, or in through and through designs. These through and through patterns are said to promise to produce unusual effects, some of which are not even possible with weaves.

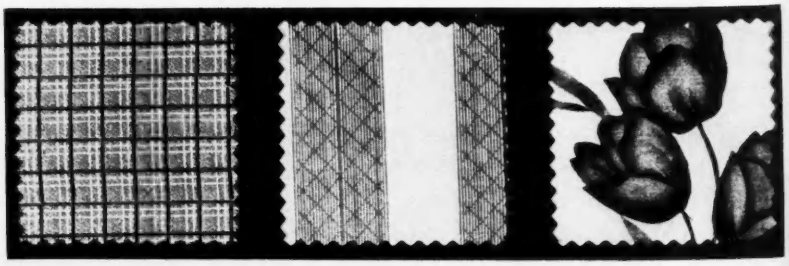
It is stated that, since Aridye colors impart a uniform coloration on all fibers, they are well suited to decorating fiber mixtures. It is thought that this characteristic may open the way to an extension of textile printing to woolens, worsteds, and fabrics composed partly of rayon.

With Aridye, the printing operation is said to be simplified. Ordinary roller machines are used with standard engravings, but it is said to be possible to employ relatively shallow engravings and so effect savings in color consumption. Good results can be obtained with considerably less pressure in Aridye printing, and machines may thus be speeded to capacity, it is claimed.

Goods are dried and then cured by subjecting them momentarily to an elevated temperature. Steaming, ageing, and washing operations are eliminated.

It is said that, under this simplified procedure, colors may be checked for possible imperfections as soon as the material is printed. Aridye prints in final colors—there is no need to wait to see the effects of steaming, or washing on color.

Cotton Fabrics Printed with Aridye



This is said to save considerable time in taking "patches."

Color preparation, too, is simplified. Aridye is shipped in cans, ready for use. Different shades may be obtained by mixing standard colors. Gum cooking, color dissolving, and paste straining are eliminated, it is claimed.

It is further claimed that left over colors on a job may be taken from the color box and stored indefinitely; also there is almost no evaporation at room temperature, and the material is easily cleaned from the rollers.

● duPONT RELEASES

Release of the following new products has been announced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.:

"Sulfanthrene" Scarlet 2BN Paste—a vat color, somewhat bluer than the Scarlet GN Paste, and is therefore useful where bluer scarlets are desired. Like the rest of the "N" brands of vat printing colors, the new type is recommended by the manufacturers for the production of smooth and level prints on delustered rayon, which are said to show good brilliancy and strength, and are resistant to long use and repeated washings. It is expected that the new color will find further use in printing bright rayon, acetate fiber, and cotton materials.

"Ondal" A—a new textile assistant, designed to serve both as a detergent and oxidizing agent in the developing of vat colors, it is said to be quite stable, releasing its oxygen at a uniform rate. Advantages cited for the new product are a decrease in the length of finishing time and number of operations required, and the assurance of easily duplicated shades.

"Lithosol" Yellow G Concentrated—the latest addition to the du Pont range of colors for the lake industry, is similar in shade to "Lithosol" Fast Yellow HN Powder, but is darker in masstone. The new product is said to be non-bleeding in water, to show only a slight bleeding in oil and alcohol, and has demonstrated satisfactory light fastness, making it well suited for printing inks. It is said to have an exceptionally high tinctorial value and is expected to prove of interest where economy is a factor.

"Monastral" Fast Blue GS—a new pigment color, is very close in shade to Peacock Blue, and is greener than "Monastral" Fast Blue BSN. It is designated for use in coloring printing inks, soap wrappers, paints, lacquers, wallpaper and kindred materials. Like the BSN type, it is said that the new color has shown fastness to light, acids, alkalies and lime and does not bleed in oil, water, or alcohol. Because of the greenness of shade, it is expected to be useful for fast greenish blues and in combination for bright greens.

● AAP RELEASE

Dyers will be interested in the new color card book just released by American Aniline Products, Inc., 50 Union Square, New York.

It's a smart color reference—richly done in a cherry red leather-like cover and bound in box-like style with gold stamped lettering.

Within this handsome, sturdily built binder, measuring 10½" deep by 7½" wide by 1¼" thick, it is claimed that dyers will find a great value in its helpful, easy-to-understand working data plus its showings of 49 dyed shades of "Raw Stock Wool Colors by the Chrome Methods."

Every dyeing is set forth in a generous circular wool swatch which is removable for study. Each dyeing is accompanied by a statement which gives its exact percentage of dye. This information is largely the result of actual dyehouse practice and should prove of real helpful assistance in handling large scale dyeings.

Its information does not stop there however—as it also contains complete directions for dissolving and dyeing and an important guide chart which gives a complete fastness tabulation of each product.

● NATIONAL RELEASES

National Aniline & Chemical Co., Inc., 40 Rector Street, New York, N. Y., announces release of bulletins describing the following products:

National Erie Catechine D C—which, when dyed on cotton or rayon, produces somewhat yellower shades than National Erie Fast Brown B Conc., and somewhat greener and duller shades than National Erie Catechine G Conc. It is said to be of particular interest in dyeing cotton-rayon hosiery containing acetate rayon effect threads, since the latter fiber is practically unstained. It is said to be readily soluble and level dyeing and to possess excellent fastness to perspiration, sea water, stoving and rubbing and good fastness to washing. Bulletin No. 219.

National Alizarol Flavin A Conc.—the latest addition to the National line of chrome dyes, possessing even better light fastness than their other chrome yellows. It is stated that it is readily soluble and may be applied to wool by any of the three standard methods: top chrome, bottom chrome or metachrome—yielding pronounced greenish-yellow shades. It is said to possess excellent fastness to sunlight, washing, fulling, perspiration, sea water and rubbing, rendering it of primary importance in the production of tan and khaki shades of superior fastness. Bulletin No. 220.

National Niagara Brilliant Blue B F L—the most recent addition to the National line of direct dyes, said to be of particular interest to the rayon dyer because of its suitability for barre rayon. It is said to be readily applied to cotton, rayon or pure silk, yielding rather bright reddish shades of good fastness to perspiration, sea water, stoving and rubbing and excellent fastness to acids and alkali. It is further said to be dischargeable to an excellent white. When used to dye union fabrics containing wool or silk, it is said to dye the animal fiber much redder than the vegetable fiber. It is stated that this dye is also of great interest for cotton-rayon mixtures since it yields more solid shades than the other direct blues. Acetate rayon effects are left clear. Bulletin No. 221.

● COMMONWEALTH RELEASE

Commonwealth Color & Chemical Co., Nevins, Butler and Baltic Streets, Brooklyn, New York, has released a booklet entitled "Specialties for the Textile Trade". Included in the booklet is a list of some of the Commonwealth products with a brief description of each which has been confined to a condensed summary of its uses and advantages. Among the products described are: Converted Starches and Gums; Sulfonated Oils; Penetrators; Detergents and other specialties. Copies of this booklet are available upon request.

● GENERAL RELEASES

General Dyestuff Corp., 435 Hudson Street, New York, N. Y., has released circulars describing the following products:—

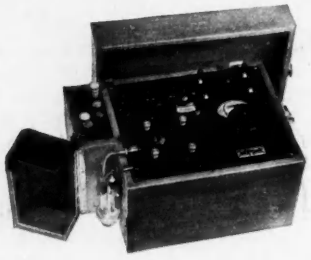
Celliton Fast Scarlet R N—which surpasses their older Celliton Fast Scarlet R in fastness to light, perspiration, neutral and acid cross-dyeing, but is practically identical with it in shade and strength. Circular I.G. 1461.

Rapidogen Brown IRRN—an improved brand of Rapidogen Brown IRR insofar as this new product is said to be very easily soluble and to develop very rapidly in acid steam. Circular I.G. 1494.

Diazo Brilliant Orange 6G Extra—which produces when diazotized and developed with Developer A, a bright reddish orange and with Developed Z A, a bright golden yellow, both said to show excellent dischargeability. Circular I.G. 1466.

● NEW, UNIVERSAL pH INDICATOR

Shown for the first time at the recent Chemical Exposition, this versatile instrument reads directly in pH with Glass, Quinhydrone, Hydrogen or any other electrode following the Nernst equation. When used with the glass electrode system furnished, simply setting the dial of the temperature compensator adapts the entire pH scale to measurements at that temperature. This applies also if a quinhy-



drone electrode is substituted for the glass electrode. Equipped with a voltage scale as well as a pH scale, it is also used in oxidation-reduction potential measurements, and in current and resistance determinations. It can be used with external circuits of much higher resistance than the 100 to 300 megohms of the glass electrode which is supplied with it.

It is claimed that this newly-designed glass electrode is small, comparatively rugged, and requires only a 5 ml. sample for measurement. Everything necessary for glass electrode measurements is included with the instrument.

Other features claimed include: quartz insulation, where necessary, to avoid leakage errors; a separate battery compartment to prevent corrosion; unimpaired accuracy in atmospheres of up to 95 per cent relative humidity; the ability to make sodium corrections, where necessary, directly in pH units.

It is stated that the Universal pH Indicator is designed to operate for years at full sensitivity and accuracy. Compactly built it is readily portable and retains all of the traditional L. & N. reliability and excellence of workmanship, it is claimed. For further information, write to Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, Pennsylvania.

The Wearing Quality of Nine White Cotton Fabrics—

(Concluded from page 260)

BIBLIOGRAPHY

1. American Society for Testing Materials. A.S.T.M. Standards on Textile Materials. A.S.T.M. Designation D-37-27. Philadelphia. 1937.
2. Ahmad, N. and Navkal, H. Fiber-Length Irregularity in Cotton. Jour. Text. Inst. 25: T49-T69. 1934.
3. Anon. Standards of Shrinkage. Jour. Home Econ. 27: 103-104. 1935.
4. Armitage, H. R. Unshrinkable Cotton Fabrics—the Rigmel Process. Jour. Soc. Dyers and Col. 50:50-51. 1934.
5. Brandt, C. D. What Staple of Cotton to Afford Good-running Yarn of a Given Count? Textile World 85:1833-1834. 1935.
6. Fargher, R. G. and Lecomber, L. V. The Determination of Starch in Sized and Finished Cotton Goods. Jour. Text. Inst. 22:T475-T487. 1931.
7. Furry, M. S. Strength Produced in Different Fabrics by Various Starches and Modified Starches. Jour. of Home Econ. 28:687-690. 1936.
8. Geake, A. The Analysis of Sized Cotton; the Determination of Zinc and Magnesium, and Some Qualitative Tests. Jour. Text. Inst. 23:T279-T292. 1932.
9. Ginter, A. E., Davidson, S. and Pearson, T. The Durability of Cotton Fabrics. Missouri Agr. Exp. Station Bulletin 340:61. 1934.
10. Griffith, M. E. and Strow, H. Relation of Price to Physical Characteristics of Some White Cotton Fabrics. Ohio Agricultural Experiment Station Bimonthly Bulletin 158:186-188. 1932.
11. Griffith, M. E. and Tucker, E. M. An Analysis of Some White Cotton Fabrics. Ohio Agricultural Experiment Station Bimonthly Bulletin 172:22-25. 1936.
12. Johnson, G. H. Textile Fabrics. pp. 152-156. Harper Bros. New York and London. 1927.
13. LaPiana, F. G. New Light on Starch Properties Affords Opportunity for Improvement of Warp Sizing. Textile World 86:1070-1071. 1936.
14. Matthews, J. M. Textile Fibers. pp. 1-6. John Wiley & Sons, Inc. New York. 1934.
15. McCullough, H. E. The Textiles We Buy and Use. Illinois Agricultural Experiment Station Circular 347:8-10. 1929.
16. Morton, W. E. and Pollard, A. The Influence of Warp Twist on End Breakage During Weaving. Jour. Text. Inst. 25:T60-T69. 1934.
17. Rosenzweig, A. How Durable Are Textiles? A Way to Determine It. Textile World 81:1686-1688. 1932.
18. Schiefer, H. F., Cleveland, R. S., Porter, J. N., and Miller, J. Effect of Weave on Properties of Cloth. U. S. Bur. of Stand. Jour. Res. 11:441-451. 1933.
19. U. S. Department of Commerce. Statistical Abstract of the United States. 1936. 784. 1936.
20. Williams, J. G. The Strength of Textile Fabrics and Their Satisfaction-giving Qualities in Conditions of Normal Use. Jour. Text. Inst. 23:P161-P170. 1932.
21. Woolman, M. S. and McGowan, E. B. Textiles. pp. 212-214. Revised Edition. Macmillan Co., New York. 1936.
22. Yoder, B. N. and Willard, M. L. Shrinkage of Cotton. Textile Colorist 67:772-775. 1936.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED: Plant-chemist, technician, desires position with progressive Finishing Plant. Experienced in processing of rayon, acetate, cotton piece-goods; can take complete charge of processing of Lastex Swimsuitings and Corset goods, can supervise laboratory control and research, economy in dyeing and finishing. References. Write Box No. 118, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED TO PURCHASE: a small second hand printing machine for laboratory work. Kindly submit details and price. Write Box No. 122, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Dyestuff Salesman. Excellent opportunity for one having contacts in Georgia and Alabama. Give experience, salary expected. Replies treated confidentially. Write Box No. 123, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Machinery designer and draftsman, ten years' experience designing and developing textile machinery. Natural creative and inventive ability has contributed to the success of numerous machines operating in the trade. Capable of modernizing present line or developing new machinery for special processes. Wishes connection with progressive machinery manufacturer or enterprising processer. Write Box No. 124, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Dyestuff Salesman for complete line of dyestuffs for the dyeing and printing trade in North and South Carolina, with established following, on strictly commission basis. State experience, present and past connections. Application treated in strictest confidence. Write Box No. 125, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.